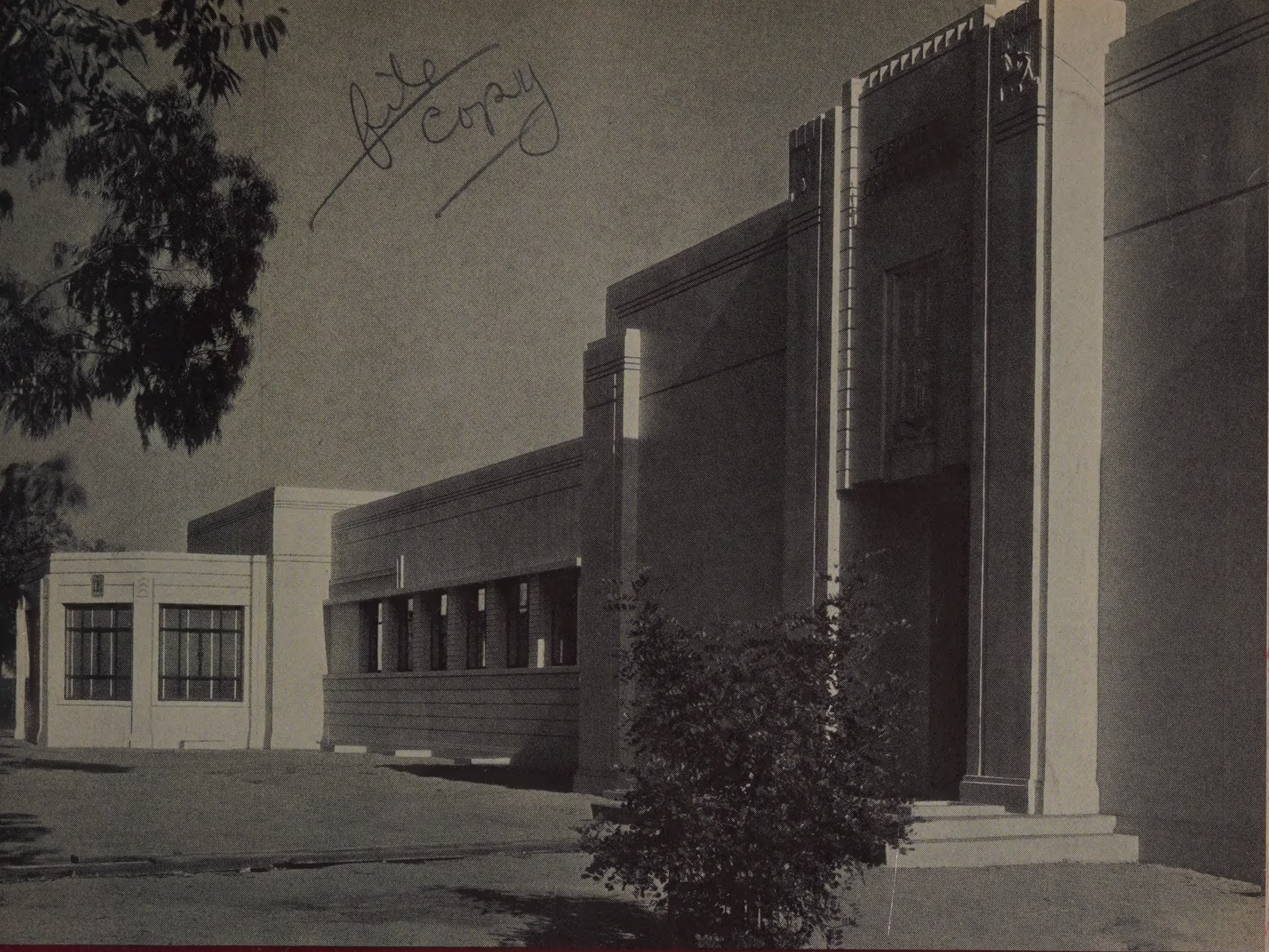
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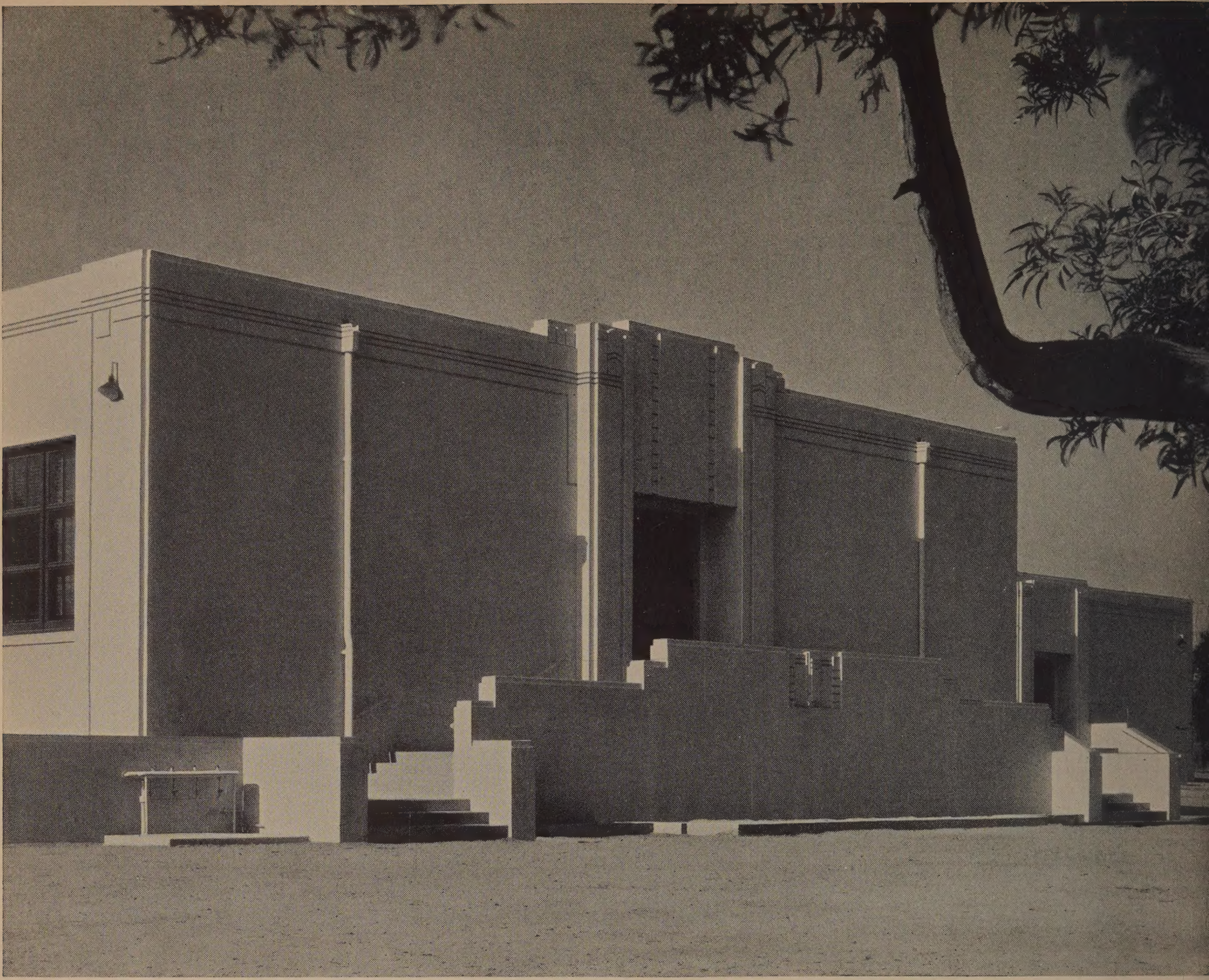
ARCHITECTURAL CONCRETE

VOLUME ONE NUMBER FIVE



GROVER CLEVELAND
ELEMENTARY SCHOOL

Pasadena, Calif.

Robert H. Ainsworth, Architect

William C. Crowell, Contractor

Simple treatment of structural members and honest use of materials combine in creation of this beautiful modern school building (also see cover). *Its hollow, monolithic concrete walls were formed against oiled plywood form liners, producing smooth surfaces.*

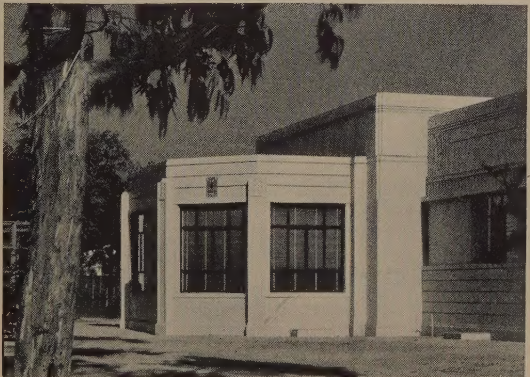
Architectural CONCRETE

Materials and Function Dictate Modern School Design

By Robert H. Ainsworth, A. I. A.

IT IS becoming increasingly evident to the architect these recent years that if beauty is to be obtained in much of his work, it must be largely produced by the manner of handling the simple materials and functional members of the structure. Costly ornament can be used only sparingly, if at all, while elaborate planning and impressive proportions are in many cases distinctly beyond consideration.

These, of course, are the same restrictions that he has been confronted with for years in the handling of industrial buildings. It is only natural, therefore, that in meeting them he should turn to some form of concrete as he has done on previous occasions. Those not previously familiar with the possibilities of monolithic concrete construction are greatly impressed with its flexibility and adaptability to their decorative as well as structural requirements. Whether it is molded, tooled, colored or left with the form impressions exposed, makes little difference if the design has been well conceived and intelligently handled.



The Grover Cleveland Elementary School at Pasadena, Calif., is illustrative of one solution to the current problem. The demolition of the previous building and its replacement, occurring during the recent general reconstruction work among schools, added to rather than lessened the usual cost restrictions. The building, as completed recently, contains seven classrooms, a kindergarten unit, two administrative rooms and a clinic—a typical small elementary school.

After thorough investigation and consideration of the many requirements, it was decided to use a hollow monolithic concrete wall section for exterior walls, with solid concrete walls for corridors. All exterior surfaces were formed against oiled plywood, keeping the form joints generally inconspicuous except in special instances where they are accentuated for purposes of design by inserting wood strips in the forms. This use of selected horizontal and vertical joints, combined with a very restricted use of waste mold ornament, constitutes the only expenditures made for pure design and decorative purposes.

The building is designed for a seismic factor of 10 percent and has a concrete slab in the corridor at the floor and roof level. This slab acts as a distributing diaphragm to the concrete cross-walls which transmit the horizontal forces to the foundations. Classroom floor and roof joists are of wood.

Special and constant attention was given to the concrete mix during all placing operations, not only to insure high structural strength but to avoid unsightly and expensive patching of exposed surfaces. The comparatively thin hollow wall sections, combined with inserts in the forms and incised ornament did not simplify this problem. Difficulties were avoided, however, by adding a definite percentage of extra fine sand to the mix; preliminary studies of various mixes having proved that this addition of fines not only definitely improved the handling qualities of the concrete in constricted spaces, but increased the compressive strength to a marked degree without change in the water-cement ratio. The final mix closely approximated a 1-2½-3¼ mix with 6¼ gallons of water to one sack of cement. Internal vibrators were used throughout in placing the concrete to insure complete compaction and a good appearance.

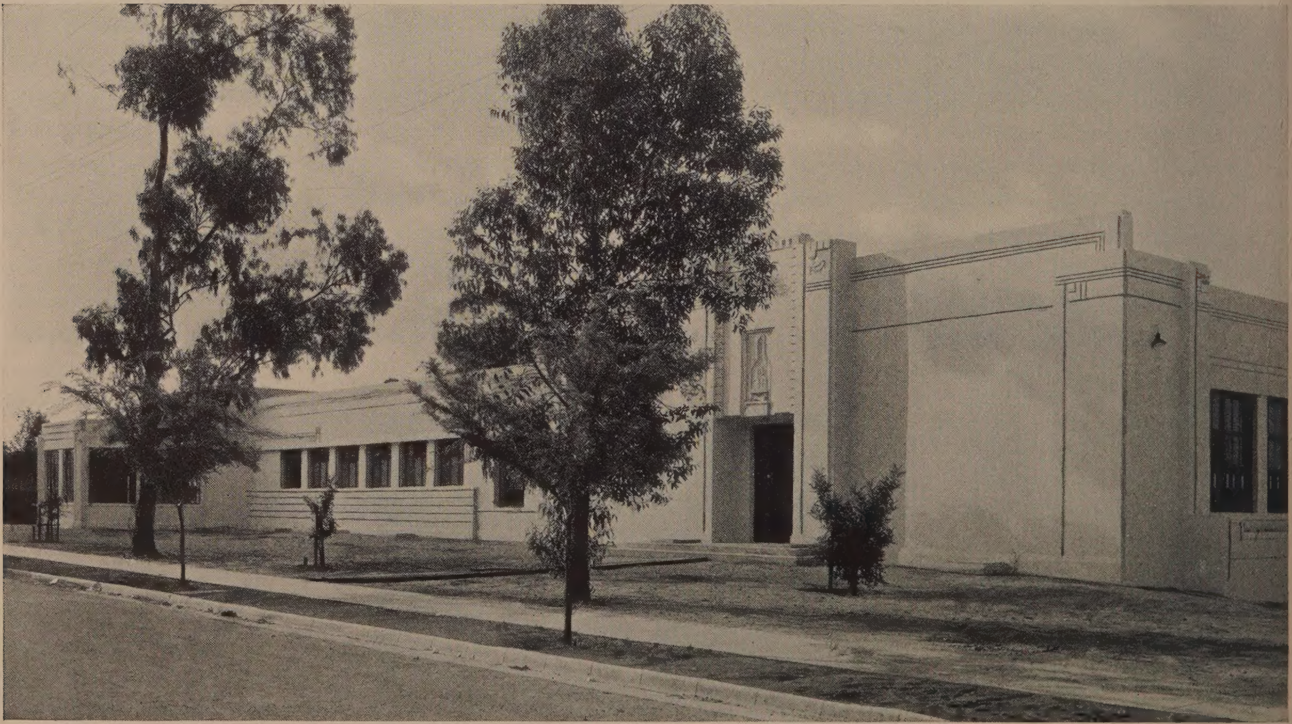
Where vibrators are used it has been our experience that extra bracing is necessary to prevent the form being racked out of alignment. This added bracing was provided on this project.

The results of careful attention to construction procedure proved highly satisfactory. Not only was patching almost entirely eliminated, but the concrete was held uniformly well above strength requirements.

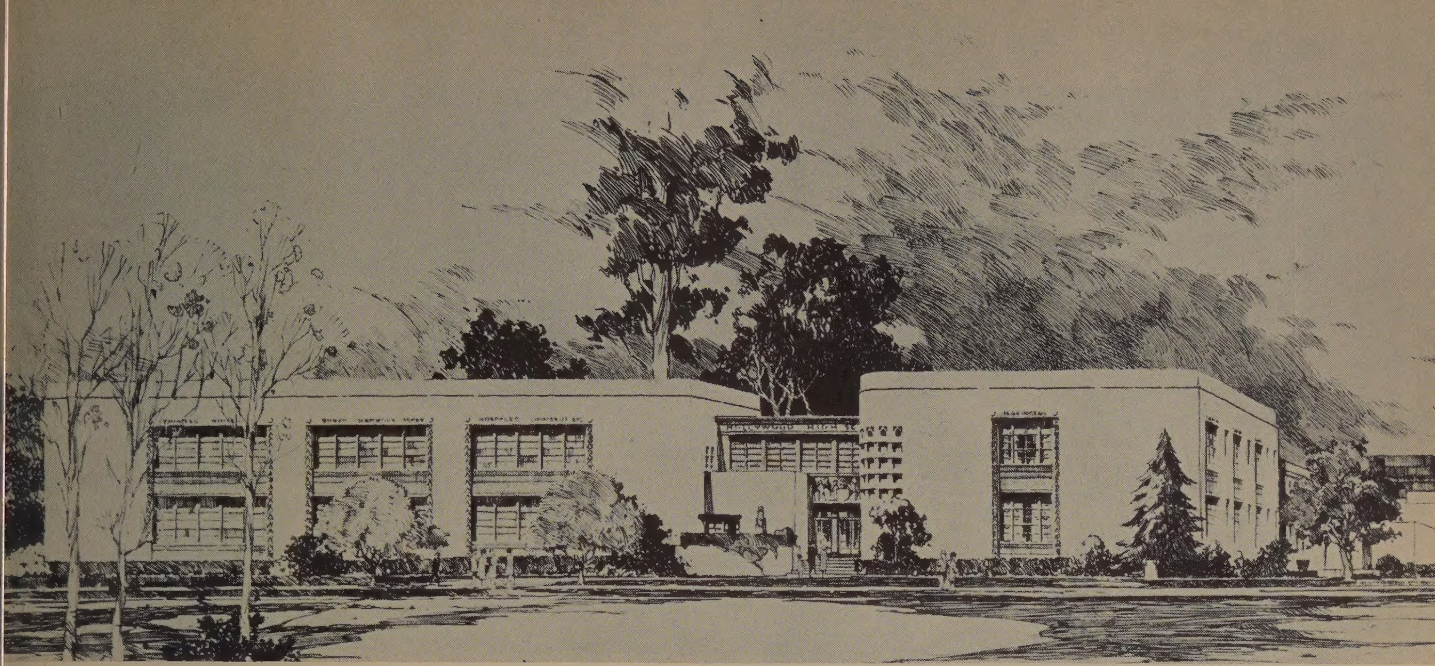
Waste molds being most adaptable to the ornamentation of monolithic concrete work, they were given thorough consideration in the design and construction. There are few types of ornamentation which give the architect such a feeling of utter freedom when he knows a reasonable amount of care will be given to the placing of concrete. As a precautionary measure, the inner surfaces of the waste molds were lined at least ¼ in. thick with a slightly different colored material than the rough backing. This warned the workmen stripping the mold that they were arriving at the surface of the concrete, thereby eliminating any excuse for marring the finished surface. Repeated use of the same design always materially reduces the cost of waste molds, particularly if the modeling cost is an appreciable item. For this reason some duplication is evident on the Grover Cleveland School.

Exterior finish of the building was a coating of cream colored cement paint.

Although the exposed concrete was painted to conform to the prevailing color of some of the more recently erected schools of this district, there are apparently few limitations to the finish that may be used on work of this nature. Here, again, the architect has a wide choice that is typical of this plastic, varied and ever interesting form of construction.



Street elevation of Grover Cleveland Elementary school reveals the limited use of ornament, all of which is cast in place with the monolithic concrete walls of the structure.



New Science Building for Hollywood High School, now under construction. Marsh, Smith and Powell, architects; R. H. Annin, architects' supervising engineer; Sarver and Zoss, contractors—all of Los Angeles.

School in Construction

By Herbert J. Powell

THE Science Building of Hollywood High School is now in process of construction at Sunset Boulevard and Highland Avenue. The style of design may be designated as a free and modern use of classical principles. The building, located on a corner with two street facades at right angles, is unsymmetrical. The over-all ground plan is 226 ft. by 189 ft. The Sunset Boulevard wing houses commercial subjects and academic class rooms while the Highland Avenue wing contains the science rooms, laboratories and the study hall.

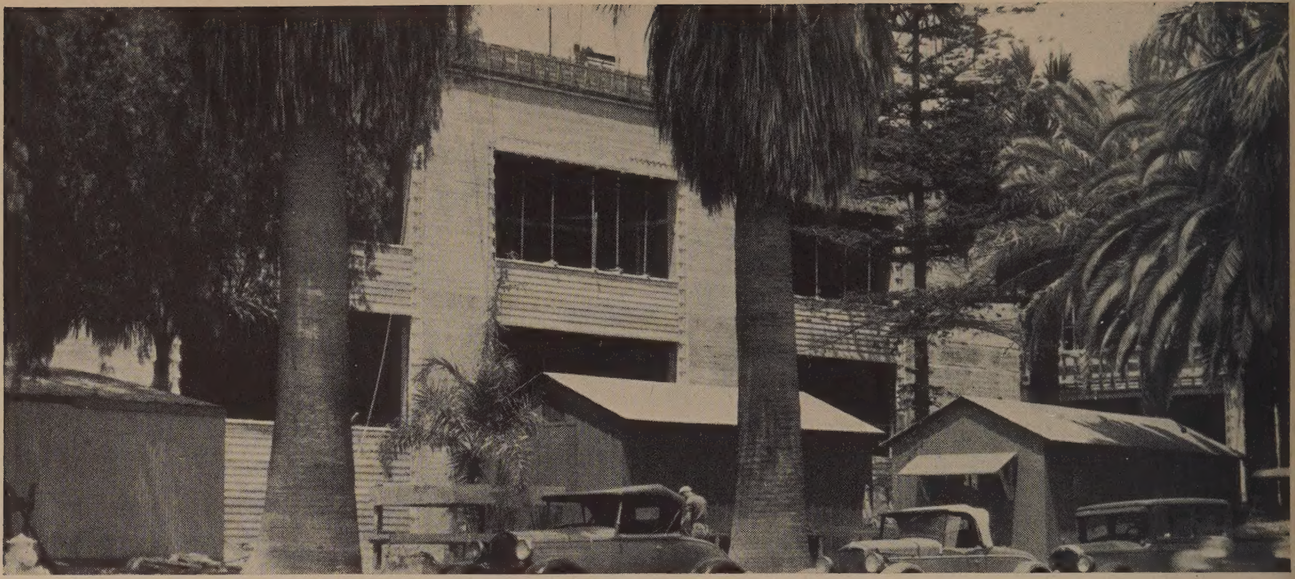
At the intersection of the two main wings is a lower connecting unit in which occurs the main entrance. Before the entrance lies a paved court, and leading from it to the street are two walled terraces. Flanking the paved court is a curved wall, pierced by a great concrete grille back of which lies one of the main stairways of the building, lighted naturally by leaded glass panes set in the concrete grille. This curved corner feature is carried out again on the north end of the Highland Avenue wing (see right of rendering) where an entrance leads to the administration building, library and auditorium beyond.

Construction work commenced late in February and at this time has progressed well on toward completion.

The building, having as it does, monolithic concrete walls, was designed with cast-in-place detail and ornament. Over the main entrance is a large sculptured panel, 17 ft. by 6 ft., cast-in-place, depicting in subject matter the history of science from Euclid and Aristotle down to Gallileo, Lavorsier and Franklin.

Cast in the jambs of the banks of windows are geometric forms as shown in the accompanying details, and over the heads of these windows at the second floor ceiling level are inscriptions cast into the walls.

Molds for the ornamental jambs (which also occur in the entrance lobby), the sculptured panel and the inscriptions, are all made of casting plaster. The balance of the molds and forms used on the work are of wood. The progress photograph of the entrance shows the plaster waste mold in place for the sculptured panel and the wood forms for the curved wall. It is good practice to leave the waste mold in place, as shown here, until work above it has been finished so that possibility of injury to the molded surfaces may be eliminated. The sculptured plaque shown here two days after the mold was cut away, has not been



Progress photograph of front elevation of school showing treatment of windows and spandrels.

touched and is just as it came from the plaster waste mold.

The entire structure is simple in outline, with no dangerous hazards of projecting cornices that might fall or break away during serious earth movements. This factor is ever upmost in the minds of architects in Southern California. The building was designed not only to meet the needs of the work that is done within its walls, but to incorporate in a thorough manner the best thoughts on earthquake resisting construction.

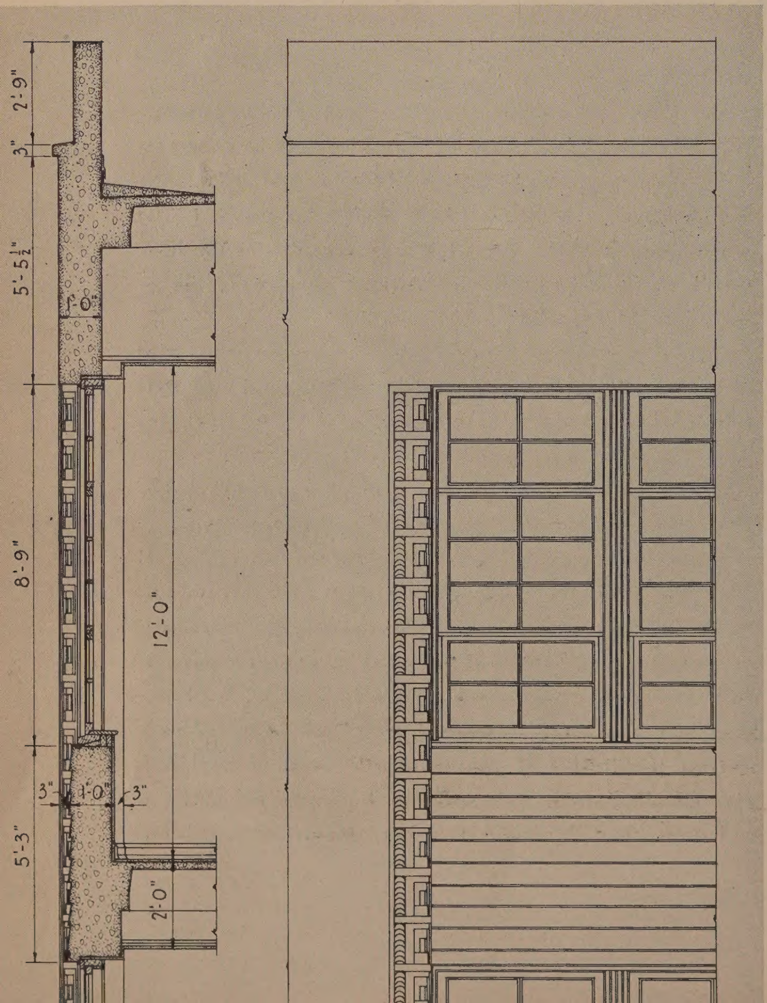
The interior walls, pan joist floors, ceiling and roof slabs are all concrete, reinforced in such a manner as to make the entire structure homogeneous. A structural separation is provided between wings so that in the event of unusual earth movement they will each act, as far as possible, as a unit and not set up torsional stresses.

Recognizing the fact that California lies in a zone of seismic activity, it is the intention of the Los Angeles Board of Education, backed by the state school building code, that insofar as is humanly possible all of their school structures will be brought to the highest standards of earthquake construction.

Beginning with a careful soil analysis by experts using special equipment, the character of the soil and its load bearing qualities were scientifically determined. With this as a basis, the engineers were able to determine the distribution of loads and stresses so as to transmit them to the foundation in a manner most conducive to the safety and stability of the structure.

The materials used—concrete and steel reinforcement—put together in a careful manner, using laboratory tests to

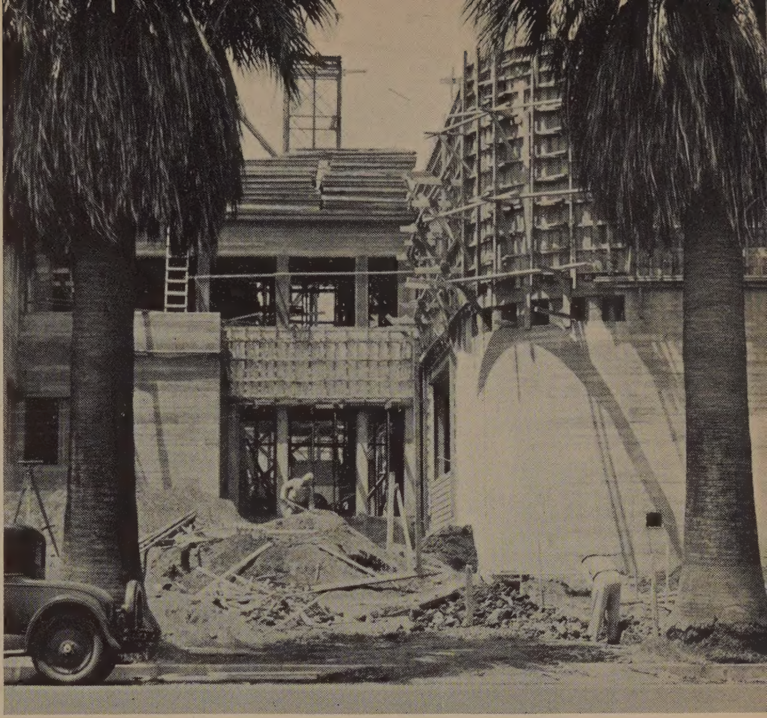
Detail of windows showing geometrical forms cast in place in the jambs.



determine the character of the aggregates and the best mix possible to assure high strength concrete, produced a structure that is not only plastic in the hands of the skilful designer, but gives a building of rugged strength sought by every engineer.

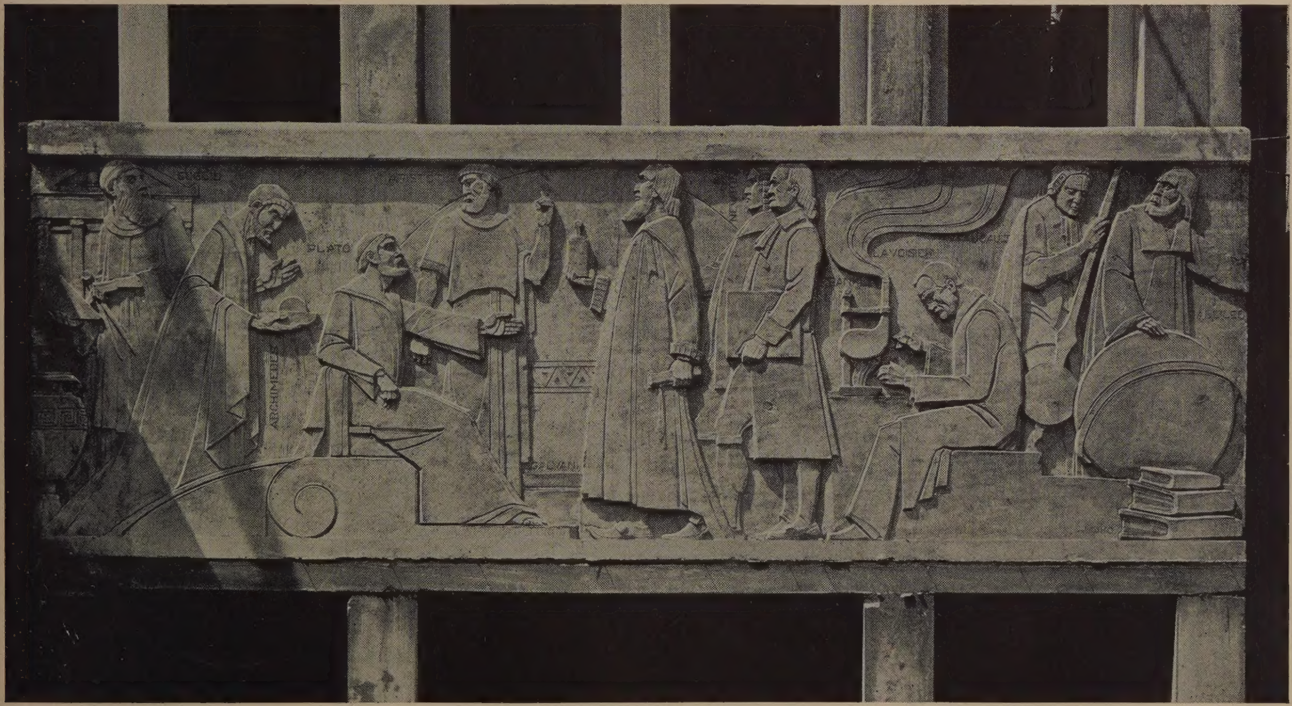
The handling of concrete has come a long way since the early days of hand shovel mixing to the present day standards of scientific laboratory study of materials, accurate measuring of water content, and the use of machines to insure proper mixing of cement and aggregates. Guesswork is no longer tolerated in the erection of a concrete structure, and since the rise of earthquake resistant construction in 1933 in California, more than usual care is exercised to make doubly sure that the methods and materials used are best suited to accomplish the outstanding aim; namely, buildings that are safe against earthquakes.

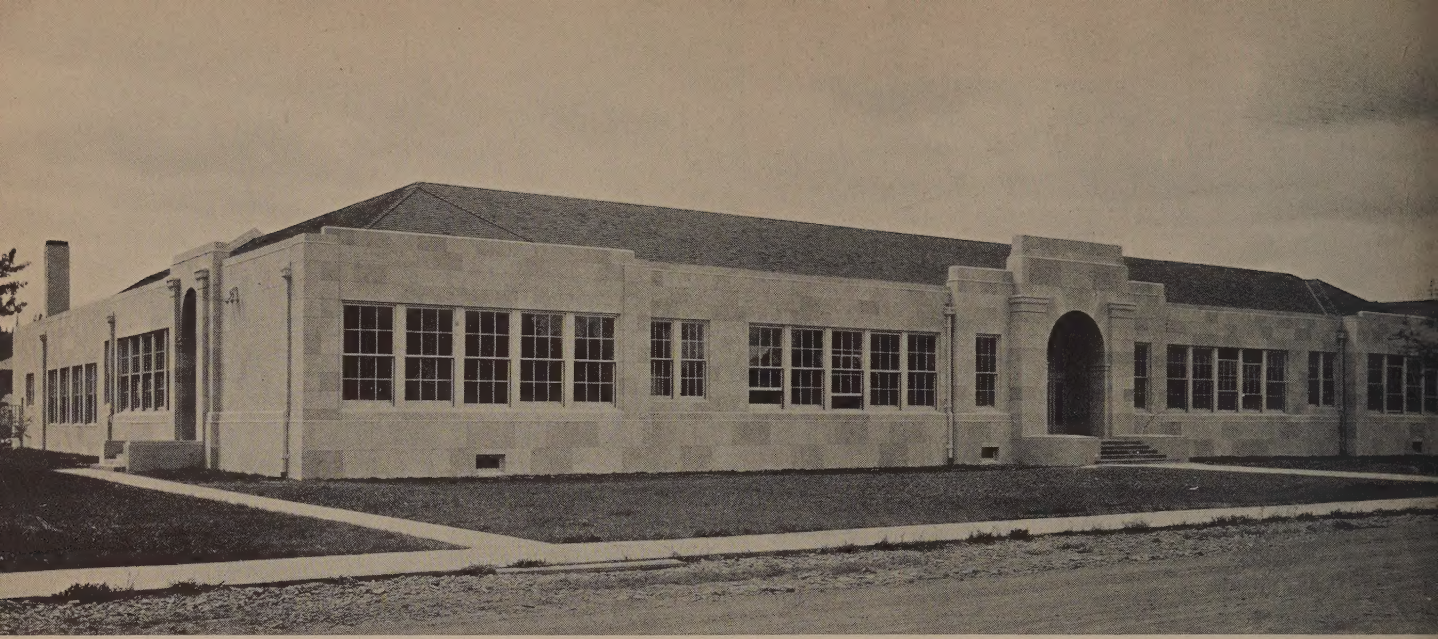
Hollywood High School is being built at a contract price of $181,120. Since its cubic contents are about 916,130 ft., the cost per cubic foot will be 19.8 cents. This cost will include rather extensive plumbing and case work necessary due to the nature of the structure. The economy of the type of construction employed for this project is definitely established by these figures.



Progress photograph of entrance. The mold for the plaque over the doorway has been kept in place while work above is completed, to protect the bas relief detail. At right is the curved wall with forms still in place over the grille.

This photograph of the plaque over main entrance, taken two days after the plaster waste mold was removed, shows how it was cast integrally with the window and door mullions. The surface of the plaque has not been touched or treated in any way.





Union High School, Sweet Home, Oregon. Monolithic concrete walls are marked off to effect ashlar surfaces. J. E. Tourtellotte, architect; Hoffman Construction Company, contractor—all of Portland.

Concrete Schools in the Northwest

By J. E. Tourtellotte

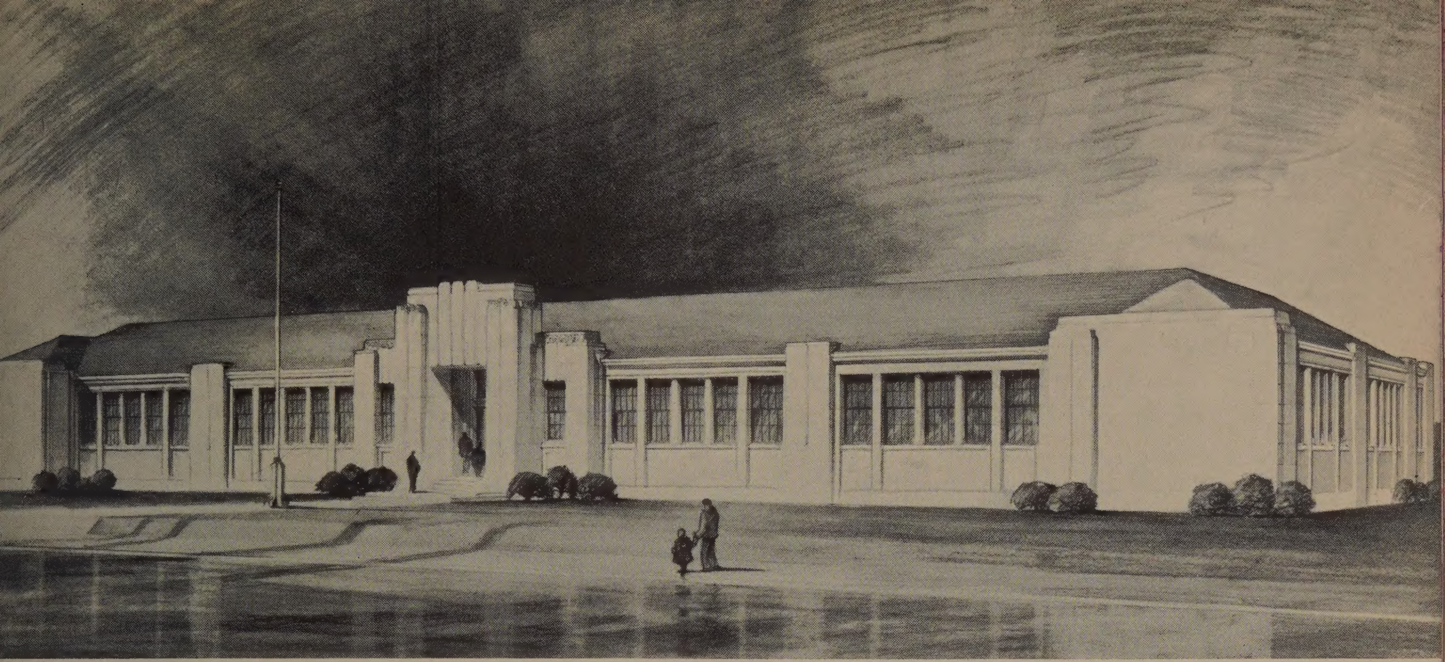
MEASURED by the development of architecture through the centuries since man first constructed rude huts of mud and thatch, some may say the changes wrought in the past score of years are insignificant. But are they? Tradition for tradition's sake has certainly been cast aside by many. No longer do American architects feel impelled to use forms and styles foreign to America. Logic rather than sentimentality is coming to be the dominant factor in design. New needs are developing a new architecture and one that promises to stand on its own feet in the future. With the casting aside of old fetters, new materials for architectural expression have been tried, and results have been refreshing.

It was with the spirit of adventure that architects of the Pacific Coast first experimented with concrete as an architectural medium. A score or more years of experience with concrete has established its right to be considered a true architectural material. Among its several attributes is versatility. Some prefer to mold it in forms of rough lumber while others use form liners to produce surfaces of maximum smoothness. The result is individuality in design that comes not only through form but through texture of surfaces as well. It has been our preference to apply a special finish to the wall surfaces, treating small areas as in an ashlar pattern, thereby securing a pleasing variation in color and texture which prevents any possibility of monotony.

Since a large portion of the work of our firm has been the design of school buildings, four such structures will best describe our particular technique in the use of concrete. These buildings are constructed along similar lines even though their geographical locations range from Oregon to Alaska where temperature extremes vary from 100 degrees in summer to 70 degrees below zero in winter. All, in common, have reinforced concrete walls.

At Hill Military Academy, Portland, Oregon, the three dormitories located along the bluff were erected in 1931. They are entirely constructed of reinforced concrete, with surfaces exposed inside as well as out, resulting in marked economy. Interior walls and the under side of floor slabs were given a tint coat of cement paint applied with a spray. On the exterior, walls were marked off in ashlar patterns and finished according to our special technique described later. The cost of building these dormitories was about 15 cents per cubic foot.

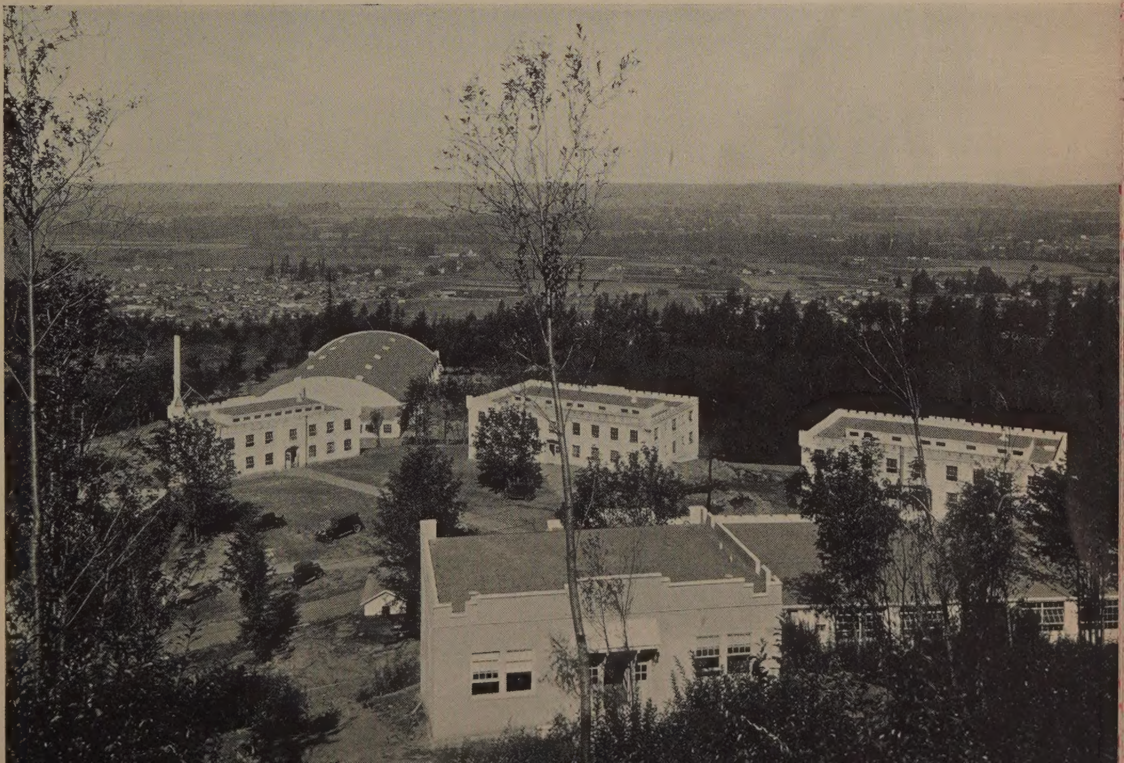
The High and Grade School at Fairbanks, Alaska, was built and occupied in 1933. The roof is mill construction,



Design for new grade school at Ontario, Oregon. This structure will be similar in construction and exterior finish to the Sweet Home school. J. E. Tourtellotte, architect; Truman E. Phillips, associate. Contracts will be let soon.

but the balance of the building including floors and partitions is entirely reinforced concrete. In this instance exterior walls were rubbed with carborundum bricks before applying a portland cement wash. This school was designed to withstand frequent earthquakes and also to resist the destructive influence of extreme temperatures since Fairbanks, lying but a few miles below the Arctic Circle, experiences temperatures from plus 90 degrees in summer to minus 70 degrees in winter. The building was erected at a total cost of $150,000, or about 27 cents per cu. ft. —a most economical figure considering the locality and the conditions under which the work was carried on.

Sweet Home High School, Linn County, Oregon, was completed in May of this year as a PWA project. It is modern in design and interior equipment. A single story, "L"-shaped structure occupying a ground plan of 180 by 135 ft., Sweet Home High School contains nine classrooms and a study hall. Architectural concrete walls are marked off in ashlar patterns. The interior is mill construction, especially fireproofed. Total cost, completely equipped, was $50,000. By using architectural concrete, at least $2,000 was saved over the cost of other materials



The three structures located on the edge of the bluff are the new monolithic concrete dormitories at Hill Military Academy, Portland, Oregon. J. E. Tourtellotte, architect; Austin Company, Cleveland, Ohio, the contractor.

offering similar advantages in strength and durability.

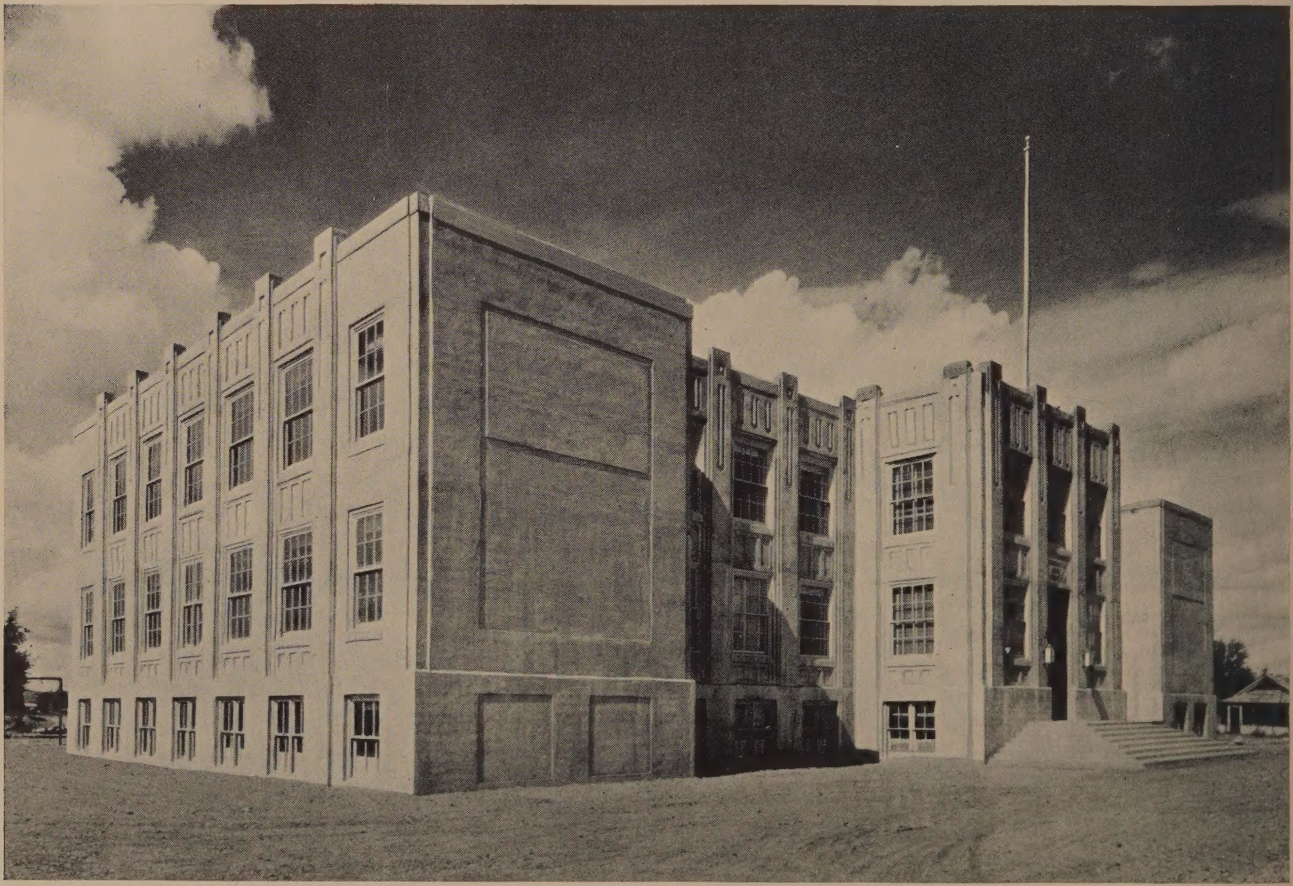
Still in the plan stage is the Grade School at Ontario, Oregon, of which a perspective is shown on page 9. As may be seen, it is a modification of the architectural design of the Sweet Home School and its construction will follow similar practice.

For school buildings designed by our firm, as well as for buildings of other occupancy, we generally require a special surface treatment for the concrete walls. It is our practice to use plywood or Presdwood lining applied to regulation shiplap forms. To produce ashlar effects, we tack joint strips 3/8 by 3/8 inches, bevelled for easy removal to the form linings.

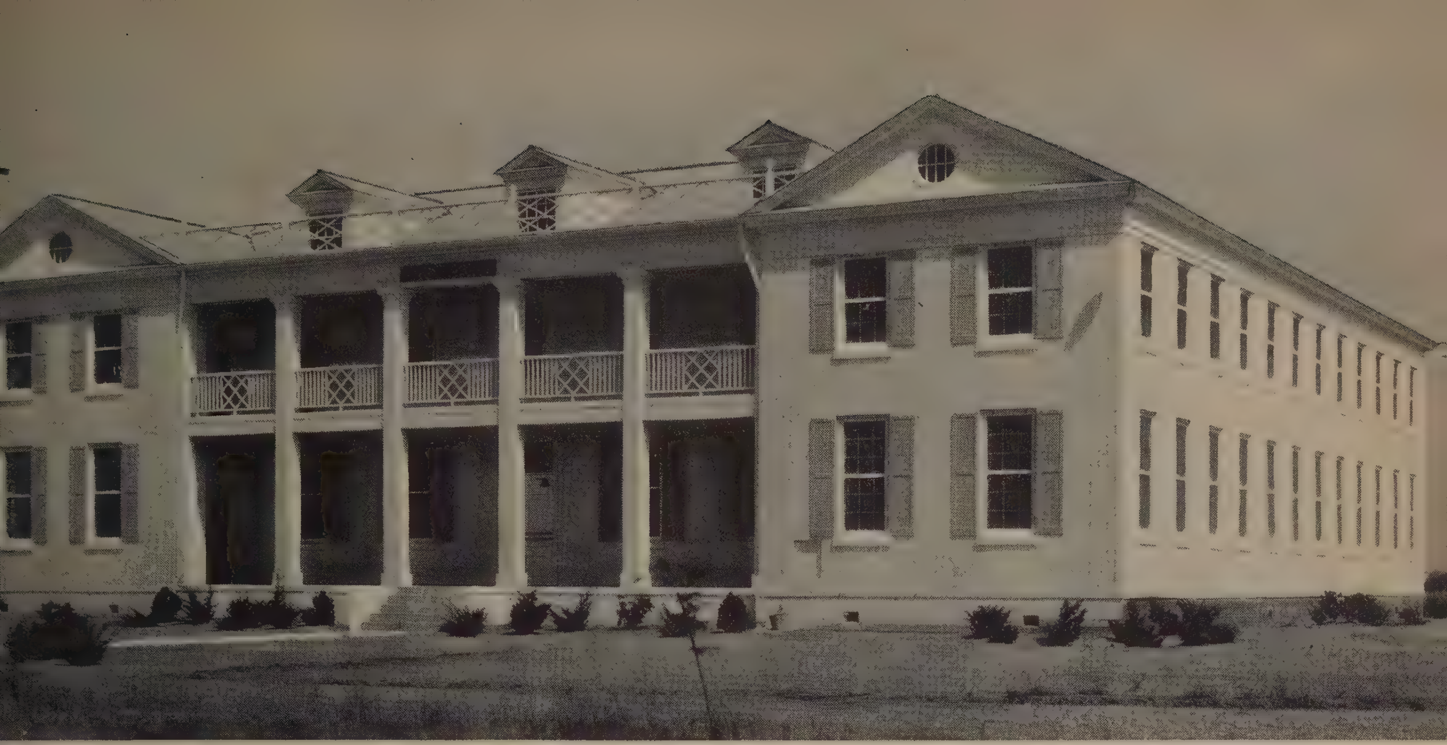
Our surface spray of tung oil and zinc oxide has been used for more than 20 years. It is applied after neutralizing the concrete surface with a solution of zinc sulphate made with 2 to 3 pounds of crystals per gallon of water. It is our practice to add a second coat including a spray of fine white sand to produce an interesting texture. We use this technique to make a pleasing and colorful surface by giving each small area a different tone and to simplify patching if that is ever necessary.

More than 15 years ago we introduced monolithic cast-in-place moldings and ornamental details. It has been our experience that such detail, no matter how simple or complex, is insignificant in cost compared to carved and applied detail—and it is structurally superior. The cost of plain wall work is about the same as common brick masonry in larger cities where supplies are plentiful and skilled masons may be had on call. In other locations, where supplies must be shipped and skilled craftsmen imported, monolithic concrete work costs far less.

Since the advantages of architectural concrete in beauty, protection against the elements and durability cannot be surpassed by any other structural or architectural material, the first and continued economy of this most amiable material has made it popular for school construction in the Northwest.



The new Grade and High School at Fairbanks, Alaska, completed in 1934, has a rubbed finish on its concrete walls. J. E. Tourtellotte, architect; McDonald Construction Co., St. Louis, Mo., was the builder.



Girls' dormitory at Reform School for Negroes, Mt. Meigs, Ala., is reinforced concrete, including exterior and interior walls, built at a cost of less than 20 cents per cubic foot. F. A. Dittmar, architect for Alabama State Department of Education, was the designer and supervisor of construction. Relief labor was used on the job.

Short History of a Surplus

By F. A. Dittmar* A. I. A.

WHEN a project is completed with a substantial balance of the original limited appropriation left unspent, it is valuable, in view of the novelty of the occasion, to analyze the job for future reference. Such a surplus existed after the new dormitory at the Alabama State Reform School for Negroes was completed this year, and here is how it happened.

Late in 1934, I was given the job of building a girls' dormitory at the Reform School at Mt. Meigs—some 12 miles out of Montgomery—to house 100 inmates. Its design had to conform to the rigid building code for state institutions with respect to space requirements per person, sanitary facilities, safety and the like—yet, its cost could not be more than $50,000.

Before a pencil was touched to paper I knew, also, that whatever type of structure would be laid out, experienced labor could not be used to build it. There was none! Such limitations would ordinarily be more than discouraging. However, the picture on this page shows a completed job despite these obstacles.

The only concern I really had about the whole problem was in my ability to convince the Board of Trustees that the monolithic concrete building I would assemble on paper could actually be built and come within the funds available. I was afraid they wouldn't believe me, although in my own mind I was fairly well decided that it could be done. I have been using concrete for years—not in a true architectural sense, perhaps, but structurally—and when this opportunity to "go all the way" presented itself, I welcomed it. Anyway, nothing else was thought of.

To begin with—here is a little of the inside history of the place: The institution's background is one of great work and never much financial help. It has always been practically self-supporting. It has grown from a 25-acre farm with one shack on it to a 2,500-acre plantation with $250,000 worth of buildings. This growth is largely due to the good management and untiring effort of Judge W. H. Thomas, associate justice of the State Supreme Court and chairman of the Board of Trustees of the school. The Reform School was originally created as a correctional institution for negro boys. The 1931 legislature, however, placed upon it the responsibility for caring for delinquent negro girls as well. No appropriation or provision was made by the

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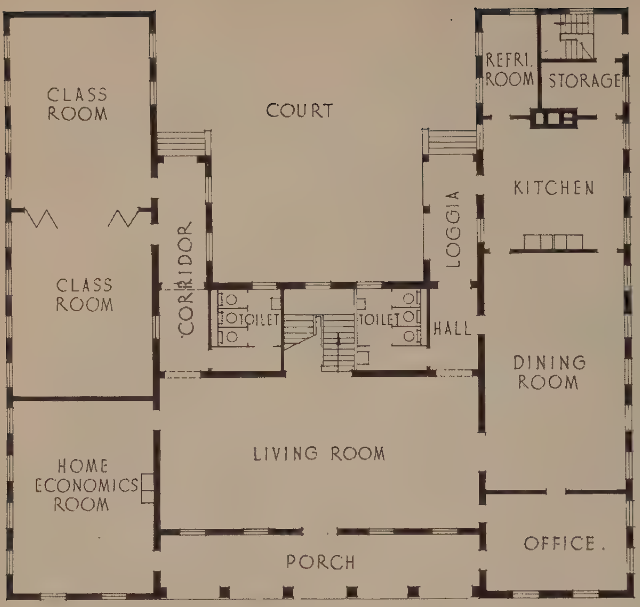
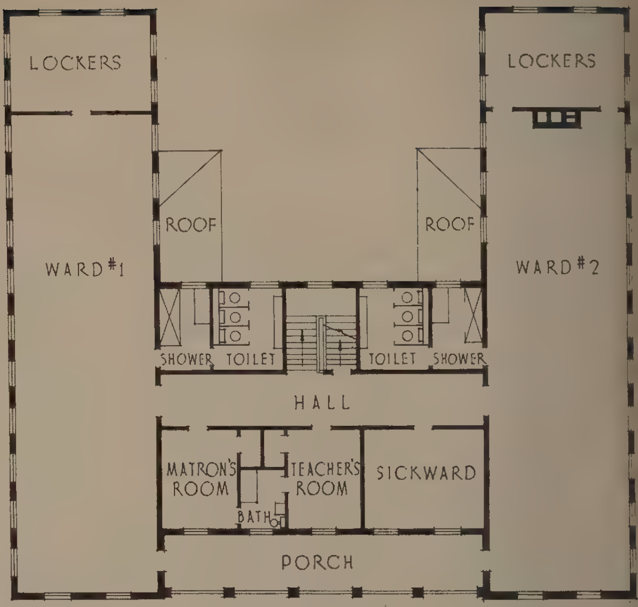
*Architect for Alabama State Department of Education.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

legislature to enable the school to provide proper quarters and facilities for training the girls.

Housing facilities for these girls were needed badly. Up until the dormitory was completed, they lived in various places adjacent to the school which was quite unsatisfactory, everything considered. However, by persistent effort Judge Thomas finally got government funds pledged and also received assurance from the local relief administration that relief labor would be supplied to erect needed quarters on the grounds. This was our "go" signal.

Why did we choose concrete? Well, for quite a number of years I have been keeping concrete cost data. From this information I knew economies of permanent construction were to be had through the use of it that could be gotten from no other material. I also knew that in using concrete as much as possible, a large share of the actual cost of the building would go to labor—an item *most* important because, as I have stated, it would be furnished from relief rolls. We had the additional advantages of gravel and sand pits of good quality right on the site.

With these facts in mind, I set about designing a monolithic concrete building that would house 100 inmates—a building that would be homelike, cost little to maintain, be fireproof, sanitary, and at the same time provide all the facilities needed to carry on the school curriculum.

The first layout included a simply designed exterior about as the picture shows it—and a two-story dormitory void of all ornamentation and non-utilitarian features. Much to my surprise, its estimated cost came way below the appropriation. There was enough lee-way, in fact, that a redesign was feasible. So, I enlarged the floor plan sufficiently to place three classrooms, a dining room, kitchen and reception room on the first floor, move the dormitory to the second floor and add there a clinic and matron's quarters. I even put a few ornamental touches to the exterior—just as you see them.

Next, Judge Thomas was convinced the cost of the new layout would not exceed the appropriation. Between us we convinced the Board of the same thing. Then, my chief worry was over and the work was started. That was late last fall.

W. H. Macon, a Montgomery man with considerable concrete experience, was employed as construction superintendent. He immediately hired competent "straw-bosses," dividing the various classes of work among them. Daily operating schedules were worked out for each class of labor. Excavators, form builders, concrete men—and so on—all had definite programs so it made little difference, after the job got under way, whether the same crew of men were furnished by the relief administration or not. This planning, I believe, was most instrumental in both the low cost and the progress of the work. There was never any lost motion.

Knowing all labor would be unskilled at best, we attempted nothing fancy. Intricate form details were eliminated for all exterior surfaces. A somewhat rough texture was obtained through direct contact between concrete and the form boards. Our only concern was seeing to it that the form boards were in proper alignment, that both inside and outside forms were securely braced and that all contact surfaces were thoroughly oiled. Incidentally, we placed all the concrete in these walls in very thin layers and gave every layer a generous spading. As a result we had practically no patching to do. We only brightened up the work by painting with white cement paint.

All exterior walls are 12-in. thick. Their interior surfaces —like the exterior—came out of the forms smooth and true. Neither furring nor plaster was used—just white cement paint. Every interior partition is concrete, too. Load bearing walls are 8-in. thick and non-load bearing walls 6-in. thick. Both are thicker than their structural requirements demand, but, because of the high ceilings and consequent deep, narrow forms, we added extra width to gain time and facilitate placing concrete. This move, from a cost standpoint, was justified.

After the concreting was finished—and that meant the job was 90 per cent completed—we did get a few skilled workers to put on the cement-asbestos shingle roof, hang the doors and windows and put up the other small amount of interior trim. When the plumbers and kitchen equipment men moved out a few weeks later, the building was ready for occupancy.

When everything was finally cleaned up, the last man and the last bill paid off, we figured that the whole job had cost less than 20 cents per cu. ft., and that there was still a balance in the building fund of $3,248.12.

In view of this, there is little wonder that this office is enthusiastic about monolithic concrete for economical building construction. Partly responsible for this enthusiasm is the following cost analysis of the Mt. Meigs job.

Items	*A.R.A.*	*Local*	*Total*
Wages and Salaries	$12,090.20	$ 8,473.24	$20,563.44
Equipment		389.10	389.10
Materials	1,899.46	23,885.13	25,784.59
Other Direct Costs		14.75	14.75
Gross Cost of Project	$13,989.66	$32,762.22	$46,751.88

Cubic Foot Contents	*Total Cost*	*Cubic Foot Cost*
234,787	$46,751.88	19.9 cents

Simplicity in School Buildings

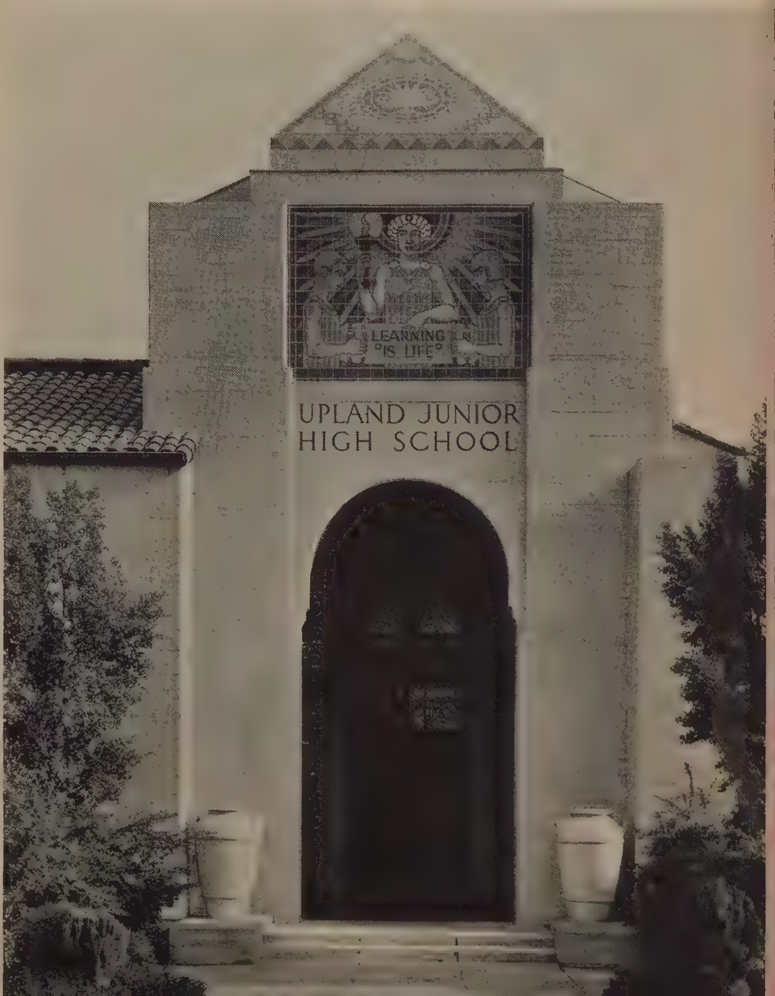
By G. Stanley Wilson, A. I. A.

ECONOMY is one of the most important factors in school construction. The architect meets it before he signs to design a job, and it starts something like this: "Here is the size of the lot; there must be so many classrooms, assembly halls, workrooms, recreation rooms and offices; this equipment is necessary. Here is the amount of money we can spend—and no more! We want the best school that can be built for the money—or less if it can be done." This first cost economy has become so familiar these days that it is a matter of routine rather than dismay.

There is, however, another type of economy that is more far reaching, more beneficial, and more difficult of achievement which the architect can design into school structures. That is the economy of *efficiency*. It is achieved by a combination of philosophy, psychology, horse sense and great pains.

The cost of operation and administration of a school over a period of years is many times greater than the first cost of the structure. Appreciable items in this cost are mainte-

The simplicity aimed at in designing Upland School is realized in this entrance detail. Only applied ornament on the structure are the tile pyramid and plaque. G. Stanley Wilson, architect.



Both the charm and the strength of architectural concrete are apparent in this interesting view.

nance—heating, lighting, cleaning, repairing and reconditioning, all of which can be controlled to a large extent by the original design of the building. The balance is in conduct of the school functions, which can be a smooth, coordinated activity or a nerve jangling confusion, exhausting energy, time and money and impairing the educational processes for which the school was erected. This extravagant confusion may also be curtailed and reduced to a minimum by efficient design.

The solution to all the problems of economy in the design of Upland Junior High School, Upland, California, was sought in simplicity. Simplicity in architectural design and construction—to minimize first cost and future maintenance; simplicity in plan to provide most efficient operation of classroom and extra-curricular activities.

The ground plan of Upland Junior High is "T" shape. In the East wing, entirely separated from classrooms and offices is the auditorium and stage. In the West wing are located the Board of Education room, principal's office, library, art room and workshop. Falling back from the cross of the "T" is a two-story classroom section, lighted and ventilated on two sides. The area of windows in comparison with the size of each of the twelve large classrooms is a scientifically correct ratio. At the south end of the classroom section, separated by a corridor, is the cafeteria under which the manual training department is located. Thus, band or glee club practice in the auditorium does not distract students in the classroom, nor does the whining of saws and planes in the manual training rooms disturb English and Math classes or lend discord to musical or other artistic efforts in the front wings.

Exterior walls, corridor walls, stairs, corridor and cloister floors of Upland Junior High are built of reinforced concrete. In keeping with the motif of simplicity, exterior walls were left exposed with no other treatment than a waterproof wash. Thus the joint lines and board marks of the forms are revealed, adding simple charm to the walls and a structural effect which could not be obtained except by exposed concrete.

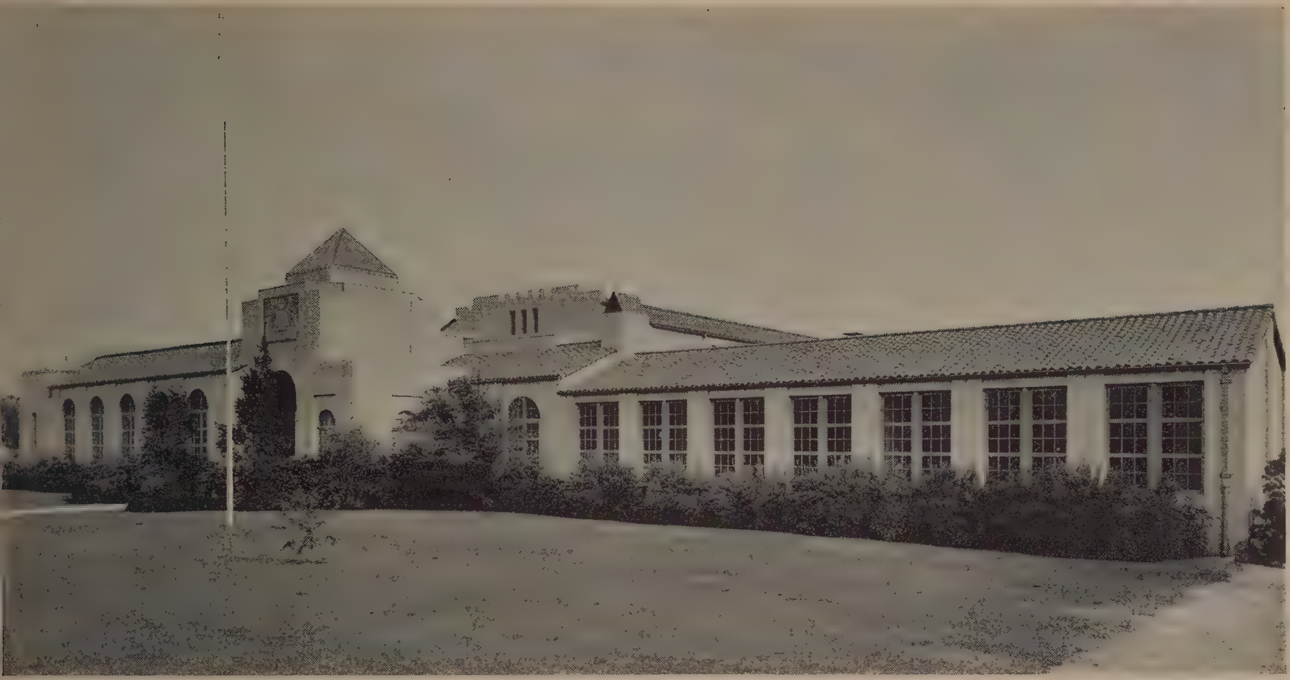
The balconies, located in the stairways, are concrete cast in place with the walls. The only applied ornament on the building is the tiled pyramid dome and the tile panel over the front entrance. All other decorative detail, composed in simple lines for arches, reveals and pilasters, was cast in place at a natural economy over any type of applied ornament.

There is very little plastering inside the building. Large flat areas of concrete in the auditorium are arranged in panels to avoid monotony, each panel being decorated with stenciled paint designs in Moorish motifs of blues, reds and golds. There are no casings around doors or windows, which, from the janitor's point of view, makes the building very easy to keep clean and in order, since there is nothing to trap dust or dirt.

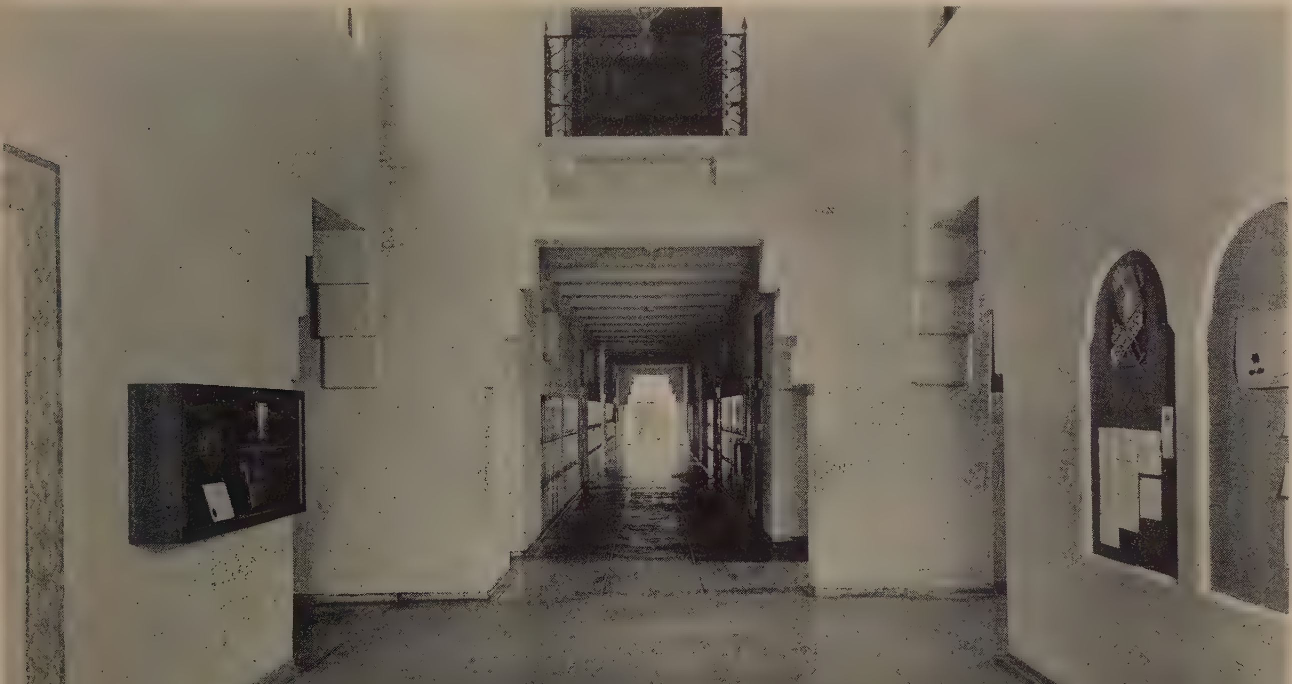
The walls of the art department are of exposed concrete treated with a bluish grey which contrasts pleasantly with the brown roof trusses. There are no closets in the building to break up the clear areas in any of the rooms, and there is very little administration space. False work is absent, nothing is hidden, nothing is fragile enough to be broken, aside from the windows.

Simple arrangement which segregates conflicting kinds of activity, plain but attractive walls inside and out, and strong, durable and integral construction are the elements upon which Upland Junior High School depends for usefulness and economy. In a building of this type the unlimited possibilities of reinforced concrete, both structural and for architectural beauty, can easily be seen.

The Upland school contains a total of 27,600 sq. ft. of floor area and cost approximately $83,000.



Front elevation of Upland Junior High School. Generous window areas and complete separation of different functional units, make this a most efficiently designed school. All concrete walls were cast in square edged lumber forms. The marks of the boards have not been effaced or smoothed by application of a cement wash.



An all-concrete interior—floors, walls and ceiling—produces an effect of cleanliness and beauty. Here decorative detail is simple, proper handling of structural members being the only attempt at ornamentation.

Architectural CONCRETE

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IN THIS ISSUE

Robert H. Ainsworth implies (page 3) that necessity is the mother of modern school design. . . . Progress on the new Hollywood High School is reported (page 5) by **Herbert J. Powell**. . . . The roving school architect, **J. E. Tourtellotte**, runs temperatures from 90-plus to 70-minus (page 8) without getting cold feet. . . . **F. A. Dittmar** has the pleasant task of accounting (page 11) for a surplus. . . . **The Economy of Efficiency**, as conceived and practiced (page 13) by **G. Stanley Wilson**. . . . Some timely information about **Expansion Joints** (pages 17, 18, 19 and 20) for your A.I.A. files. . . . **California School For The Deaf** (page 21). . . . Proposed new schools for Jackson, Miss., and San Antonio, Tex., are described by **A. Hays Town** and **Robert M. Ayers** (pages 24 and 25). . . . There's no place for ivy on the modern school thinks (page 26) **Stiles O. Clements**. . . . **Norman F. Marsh** describes a school (page 28) that tells several stories. . . . Grant Union High School (page 30) by **Harry Devine**. . . . **File** 10-7-1 (page 32) looks to the future. . . . America's No. 1 **Air Base** (page 34) looks like a Spanish village.

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Schools of Tomorrow—Today

The "school of tomorrow" as conceived recently in a symposium of ideas of architects, teachers and educators, may be advanced for today; but it is not too far ahead for architects to incorporate many of its features in their current school designs. The schools described and illustrated in these pages prove this. There is little that is familiar about these buildings and little to remind us of the schools we were proud of ten to fifteen years ago.

In the first place, they have individual appearance. Not one of them looks like a county court house without a dome, or a skyscraper that stopped too soon.

They are all fireproof and look like it, for there is no maze of fire escapes to suggest hazards and completely hide architectural treatment.

Since there is great disadvantage in numbers where education is concerned, they are generally small schools providing complete facilities for a smaller number of pupils who will be assured more individual attention with less confusion and tumult.

Each is designed for the particular age of students it is to shelter. Elementary schools are for young children, built for their health, comfort and enjoyment. High schools, junior high schools and grade schools are separate structures in which each stage of educational development is treated in its own manner.

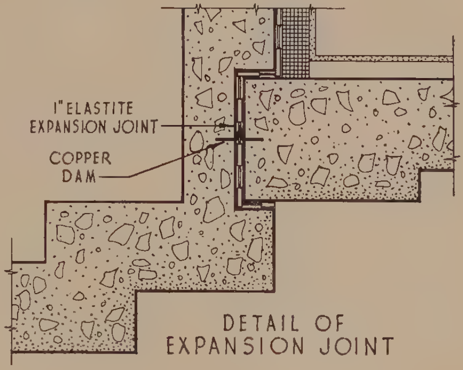
These schools represent additional facilities, answering the need for more and more schools to accommodate the increasing numbers of pupils, both child and adult.

Finally—all of these schools are of sound, durable construction, simply designed for erection at costs within the limited means of school board budgets.

While it is possible that no individual school reviewed here contains all of these features of the school of tomorrow, each contains some. This is proper. The ideal school must be evolved by thought and experiment to be sound. This requires time and a gradual acceptance characteristic of anything that is new.

ROBERT E. LEE SCHOOL, DALLAS, TEXAS; DEWITT AND WASHBURN, ARCHITECTS, DALLAS; ECKERT BURTON CONSTRUCTION CO., DALLAS

EXPANSION JOINTS IN CONCRETE BUILDINGS



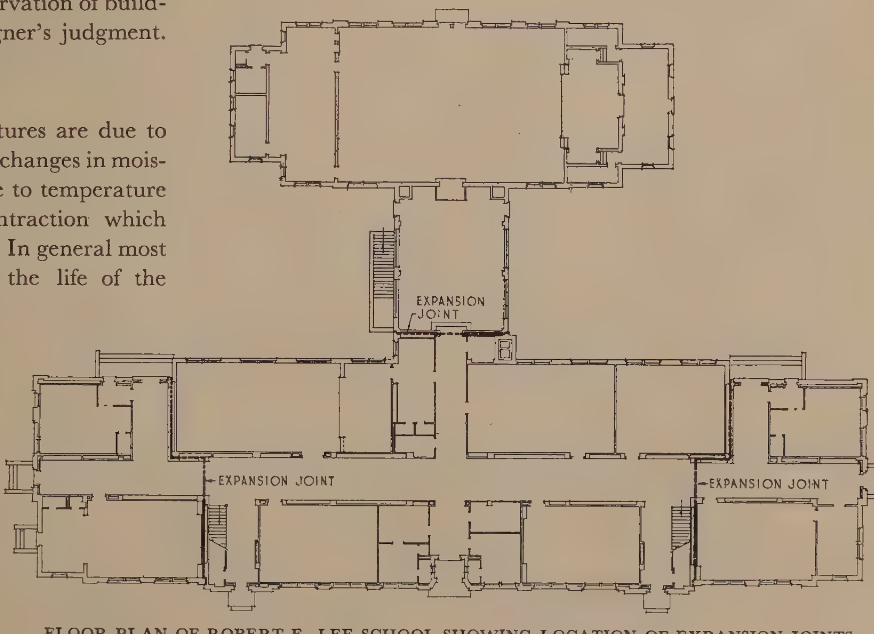
DETAIL OF EXPANSION JOINT

MOST buildings do not require expansion joints and as a rule they should be avoided wherever possible. The purpose of expansion joints in reinforced concrete buildings is to relieve the structure of stresses due to volume changes that result from variations in moisture content and temperature. If a building were free to expand and contract no stress of importance would develop from such movement but in actual practice this is seldom the case. For the most part buildings of ordinary size and regular in plan can be designed to resist the stresses caused by volume change without recourse to expansion joints. Under certain conditions of size and plan, however, it is desirable to provide joints to separate a building into independent units such that the stresses developed will not cause damage detrimental to the structure's utility or appearance.

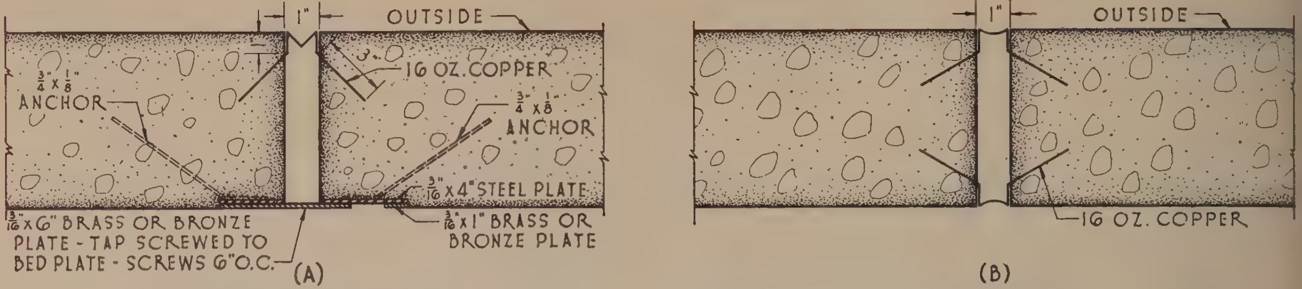
A number of factors influence the need for expansion joints, so definite rules can not be established as to either their size or location. Consideration of the causes of volume change and observation of buildings in service are a guide for the designer's judgment.

Volume Changes

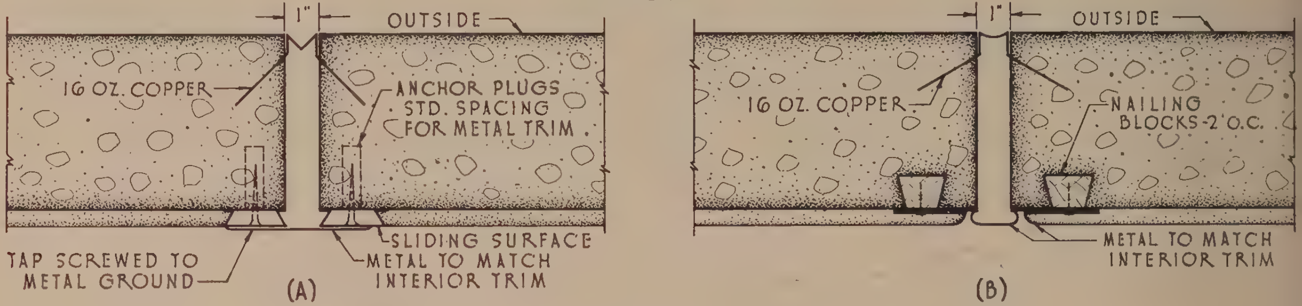
Changes in volume of concrete structures are due to two causes: temperature variations and changes in moisture content. The volume change due to temperature variations is one of expansion and contraction which may be a daily cycle or a seasonal one. In general most buildings continue to dry out during the life of the structure so the volume change due to variation in moisture content is one of shrinkage only. Rain on the walls of a building, unless of very long duration, will not cause an appreciable gain in moisture content of the concrete. There may be a slight gain or loss of moisture because of seasonal changes in atmospheric humidity but for practical purposes concrete in buildings may be assumed to shrink and not swell.



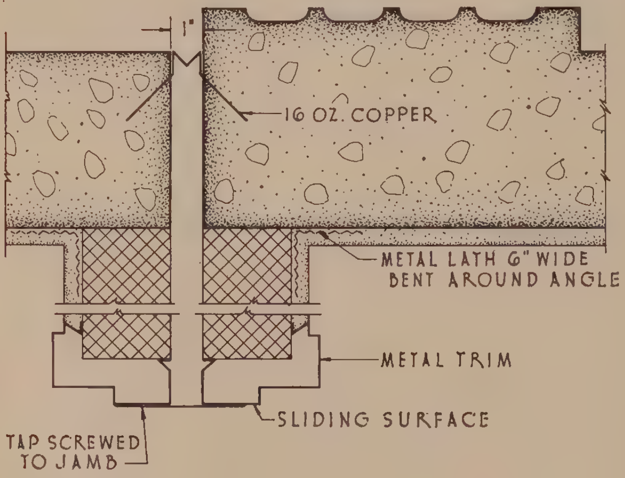
FLOOR PLAN OF ROBERT E. LEE SCHOOL SHOWING LOCATION OF EXPANSION JOINTS


1"
OUTSIDE
3/4 x 1/8 ANCHOR
3"
16 OZ. COPPER
3/4 x 1/8 ANCHOR
3/16 x 4" STEEL PLATE
3/16 x 6" BRASS OR BRONZE PLATE - TAP SCREWED TO BED PLATE - SCREWS 6" O.C.
3/16 x 1" BRASS OR BRONZE PLATE
(A)
1"
OUTSIDE
16 OZ. COPPER
(B)

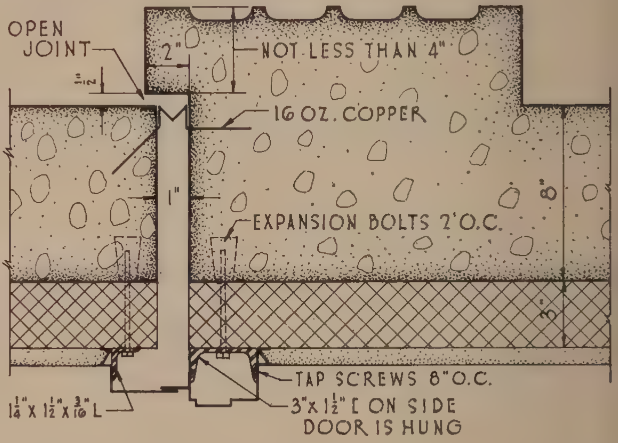
EXPOSED WALL JOINT - UNPLASTERED INTERIOR
FIG. 1


1"
OUTSIDE
16 OZ. COPPER
ANCHOR PLUGS STD. SPACING FOR METAL TRIM
SLIDING SURFACE
TAP SCREWED TO METAL GROUND
METAL TO MATCH INTERIOR TRIM
(A)
1"
OUTSIDE
16 OZ. COPPER
NAILING BLOCKS - 2' O.C.
METAL TO MATCH INTERIOR TRIM
(B)

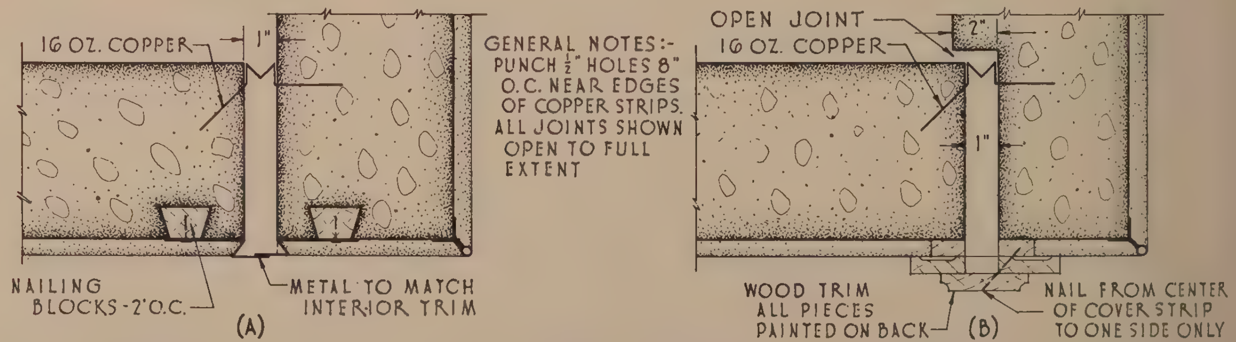
EXPOSED WALL JOINT - PLASTERED INTERIOR
FIG. 2



WALL JOINT AT PILASTER
INTERIOR PARTITION WITH METAL JAMB
FIG. 3



WALL JOINT AT PILASTER
FURRED AND PLASTERED INTERIOR WITH
EXPANDING DOOR BUCK AND FRAME
FIG. 4


16 OZ. COPPER
1"
NAILING BLOCKS - 2' O.C.
METAL TO MATCH INTERIOR TRIM
(A)
OPEN JOINT
16 OZ. COPPER
2"
1"
WOOD TRIM ALL PIECES PAINTED ON BACK
NAIL FROM CENTER OF COVER STRIP TO ONE SIDE ONLY
(B)

GENERAL NOTES:- PUNCH ½" HOLES 8" O.C. NEAR EDGES OF COPPER STRIPS. ALL JOINTS SHOWN OPEN TO FULL EXTENT

WALL JOINT AT REVEAL - PLASTERED INTERIOR - METAL & WOOD TRIM
FIG. 5

The expansion and contraction of a building due to any cause is restrained and affected by many conditions and therefore can not be computed accurately. A rough indication of the amount of movement caused by temperature changes is obtained by multiplying the average thermal coefficient of expansion of concrete, .000006, by the length of the structure times the degrees change in temperature. In other words, the movement that might be anticipated at the expansion joints in a building divided into 100 foot sections for a 50-degree change in temperature will be of the order of ¾-in.

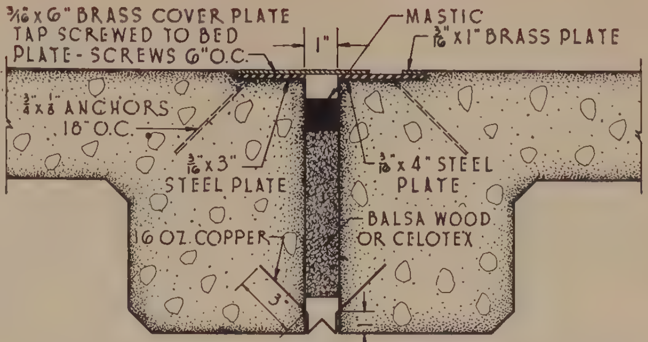
The shrinkage of concrete due to loss of moisture is dependent upon the amount of water used in mixing, the quantity of cement used in the mix and the extent to which the concrete is cured. In actual practice because of incomplete drying and the restraint offered by reinforcement the shrinkage that will occur is materially less than determined by laboratory experiments. On the average job in which the concrete is made with 6 to 7 gallons of water to the sack of cement and 5 to 6 sacks are used to a cubic yard of concrete the shrinkage will vary between ¼-in. and ½-in. per 100 feet.

Observations of buildings in service indicate the total movement is somewhat less than half that which might be anticipated by combining the contraction due to temperature drop with shrinkage. It appears safe to consider that the maximum movement at joints located 200 feet apart will not exceed 1 in. under most unfavorable conditions.

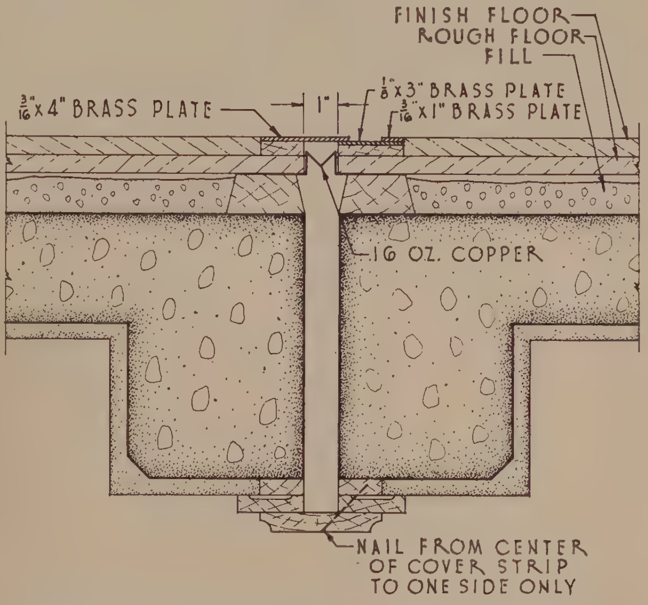
Buildings under 200 feet long are seldom provided with expansion joints, while longer buildings should have at least one joint and in general they should not be farther apart than 200 feet. The plan of a building should influence the designer's judgment in the frequency and location of joints. If there is a very large inner court, a group of elevator hatches or other opening extending through the building forming a materially weakened section, it is advisable to locate joints at one or both ends of the opening. Although there is no definite indication that joints should be provided where a building changes direction, as for instance in L-, T- or U-shaped structures, unless the adjoining parts are quite dissimilar in size, some designers locate joints at such places as a precautionary measure.

In order to be effective, expansion joints should extend entirely through the building, forming independent units. Column footings that may come at expansion joints need not be cut through unless the columns are very short and stiff. Joints should extend through foundation walls; otherwise the restraining influence of the wall below grade, which is without a joint, may cause the wall above to be cracked in spite of the joint in it. Reinforcing must never pass through an expansion joint.

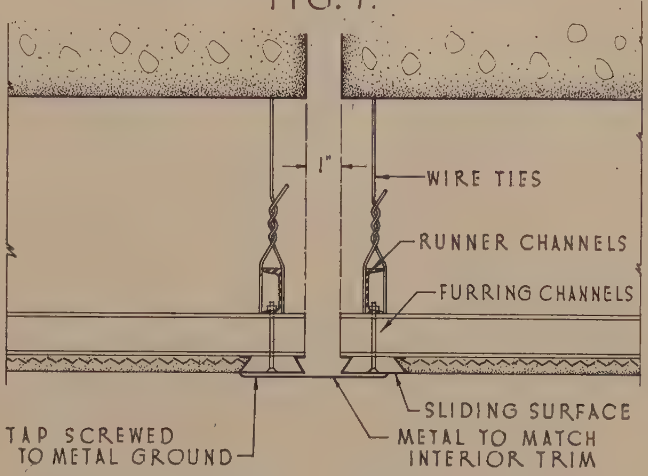
The architectural treatment of the exterior walls will determine to some extent where joints can be located without marring the appearance of the building. It is advisable to place joints where they can be obscured by a pilaster, reveal or other architectural detail. Two purposes are served: the joint is less conspicuous, if visible at



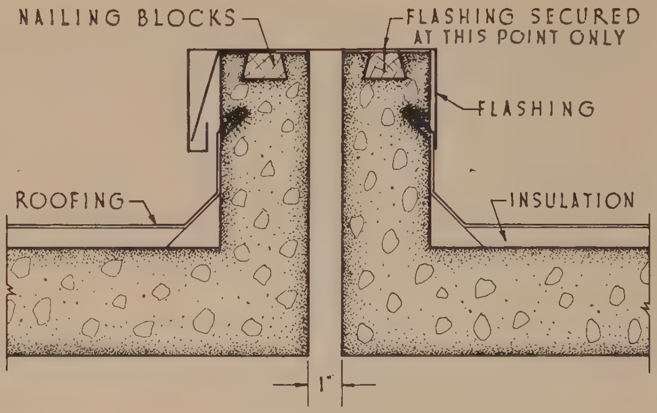
FLOOR AND BEAM SOFFIT JOINT
CONCRETE FLOOR FINISH
FIG. 6



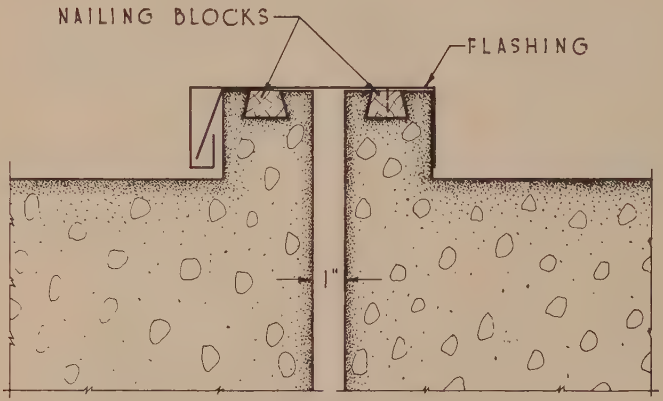
FLOOR AND BEAM SOFFIT JOINT
WOOD FLOOR AND TRIM
FIG. 7.



JOINT IN SUSPENDED CEILING
BENEATH CONCRETE FLOOR
FIG. 8



ROOF JOINT
DISCONTINUOUS MEMBRANE ROOFING
FIG. 9



COPING JOINT
FIG. 10

all, and it is easier to make the joint weather tight because of the protection afforded.

The Robert E. Lee School, Dallas, Texas, shown on page 17 is an example of a building of moderate size in which expansion joints were used to separate a projecting wing from an adjoining portion of the building. Joints were also located at two places where reveals change the section of the building and might result in a concentration of stress that would cause cracks unless the stresses were relieved by expansion joints. The places chosen for the joints make them inconspicuous. The detail used is an effective one.

Expansion joints should always be made as simple as possible without sacrificing effectiveness. They must be designed to be positive in their action. Care should be taken in detailing to avoid possible damage to the building or the joint itself through failure to operate properly. Wind and watertightness are essential; so some form of seal is necessary. Usually a crimped copper strip of 16 oz. metal is used for this purpose. One-half inch diameter holes at 8-in. centers should be punched near the edges of the copper strip to securely anchor it in the concrete.

It is generally advisable to place the copper strip so it is flush with the exterior surface of the wall as illustrated in Fig. 1. If the joint is filled with mastic, it is liable to be extruded when the joint is closed, making an unsightly appearance. The copper strip at the surface can be painted to match the color of the wall; so it is quite inconspicuous. In all of the details, the joints are shown open to the fullest extent. If a building is constructed in summer, there should not be more than ½-in. between the two surfaces of the joint. If desired the bond between the two surfaces may be broken simply by inserting a piece of tar paper in the joint, thereby allowing no appreciable space between the two adjoining sections. In a building constructed in winter the same practice may be followed, although the building may be fully contracted at the time of construction because expansion seldom causes damage in a building unless it is located between other structures. In that case a definite space is necessary to allow for expansion.

Joints must sometimes be located in the flat surface of a wall, unobscured by any detail. If this cannot be avoided, the details shown in Fig. 1 and 2 are satisfactory. When a joint is located at a pilaster or a reveal, the simplest construction is to make the joint just at the edge of the return as illustrated in Fig. 3 and 5a. Sometimes it is desired to completely obscure the presence of a joint when viewed from directly in front. This can be done at a pilaster or at a reveal as shown in Fig. 4 or Fig. 5b.

It is not desirable to locate a partition at an expansion joint, but when it cannot be avoided, a double partition with expanding metal or wood trim offers a solution of the problem. Typical construction is illustrated in Fig. 3 and 4.

Floor joints must be made so water will not leak through to the floor below and provision must be made for a smooth traffic surface. Water seals should be provided unless it is definitely known that there will be no water on the floor. Sliding plates that are flush with the floor surface interfere least with traffic. Thresholds that project above the floor surface except in doorways are objectionable. Examples of floor and ceiling joints including a joint in a suspended ceiling are shown in Fig. 6, 7 and 8.

The roof is always a critical place at an expansion joint because of the possibility of leakage. A detail such as illustrated in Fig. 9 is positive in action and does not depend upon the integrity of the roofing for its success. The joint is covered by flashing and sufficient clearance is allowed between the curb walls and the lip of the flashing so there is no danger of tearing the metal. A strip of copper seals the clearance space so water cannot be blown under the flashing.

Wall and roof joints must be made continuous over parapets. The water seal or flashing must be made continous so there will be no place for leakage. A satisfactory detail is shown in Fig. 10. Various modifications can be made adaptable to parapets and copings of different types.

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General view of California School for the Deaf at Berkeley, erected in two units by the State Department of Public Works. All buildings are reinforced concrete including exterior walls, interior bearing walls and roof slab.

School for the Deaf

THE task of providing an education for deaf children in California is a full time job. The state has met the difficulty of conducting day schools for people thus handicapped by the establishment of a large boarding school where special training and regular classroom work may be carried on without interruption or hazard to pupils. This institution, known as the California School for the Deaf, is located on a 60-acre plot in Berkeley. The area, now built up and landscaped, contains school facilities, residences, auxiliary buildings and playgrounds.

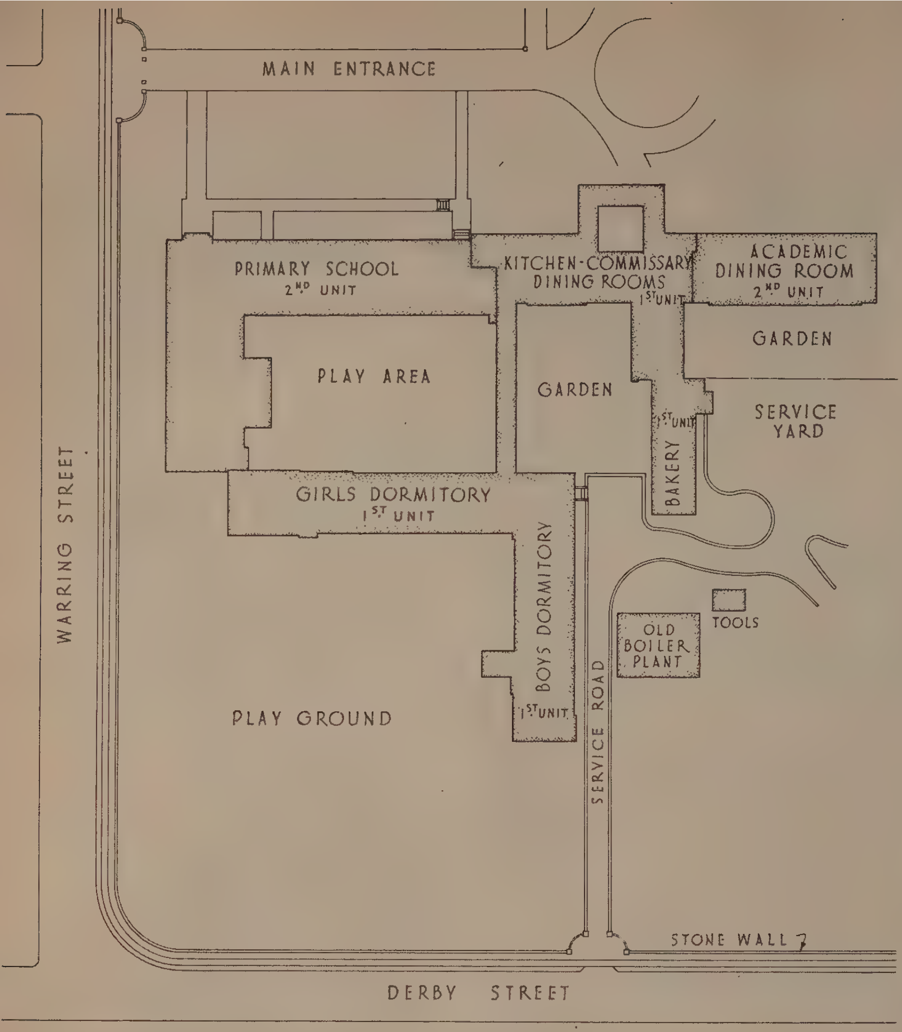
Much could be said about the work done at this school because the processes of fitting these less fortunate children for life in a normal, competitive society is very fascinating. Here, however, we are chiefly concerned with the project of building the institution.

The school for the deaf is located in a rectangle of land running north and east from the intersection of Warren and Derby streets in Berkeley. The structures were erected in two units, completed in 1931 and 1933 respectively. The first unit included kitchen, commissary, bakery, primary dining hall, primary boys' dormitory and primary girls' dormitory. The cost of these buildings was about $285,000. They were designed by the Division of Architecture, State Department of Public Works, of which George B. McDougall is state architect. General contractors for the project were Monson Brothers of San Francisco.

The second unit comprises the primary school and academic dining hall. They were designed by Charles F. B. Roeth, Oakland architect, under the direction of the Division of Architecture. K. E. Parker, San Francisco, was the general contractor for the job, and Walter L. Huber the structural engineer. Cost of the buildings was approximately $200,000.

All buildings are of reinforced concrete including exterior walls, interior bearing walls, columns, beams and roof slab of the school and academic dining hall. The exterior walls and the walls of interior stair halls are of exposed concrete. Other interior walls are furred with metal lath and plastered.

The architecture of the buildings follows a modification of the Mediterranean style which is appropriate and popular in California. Spanish type balconies occur frequently, overlooking gardens and playgrounds. All of the structures are roomy and pleasant, with fenestration



planned to provide for maximum light and ventilation.

Since concrete proportioned for good workability and careful workmanship in placing are the secrets of successful architectural concrete construction, special care was taken to follow definitely approved practice for all operations throughout the project. Specifications were written to this end, and carried out to the letter with the result that desired effects were obtained in concrete that is of high quality and strength.

Form sheathing lumber used was 1 by 6, surfaced on one side and two edges. The rough side of the boards was used as the contact surface for the exterior concrete walls and the sheathing, being surfaced on one side only, varied sufficiently in thickness to accentuate the joint lines slightly, thereby producing a surface texture with character. The surfaced side of the boards was used to form the exposed concrete on interior walls. Unsurfaced boards were used for the ceiling forms with slash grain lumber in uniform lengths comprising the forms for the larger beams and coffers in order to leave a distinct grain impression in the concrete.

All horizontal joints between form boards were made continuous over flat areas and around corners. This is very essential to good appearance. Vertical joints in all cases were staggered. Where smoother concrete surfaces were desired form liners of Presdwood or Celotex were used. These materials as well as plaster waste molds were shellacked before being oiled.

All forms were tied with ⅜-in. round rods, secured with form clamps. The tie rods were greased before placing them in the forms to facilitate pulling. All rods were pulled back from the outside surface of the wall at least 2 inches and the ⅜-in. holes were carefully plugged. The forms were rigidly braced and substantially built to withstand the action of mechanical vibrators.

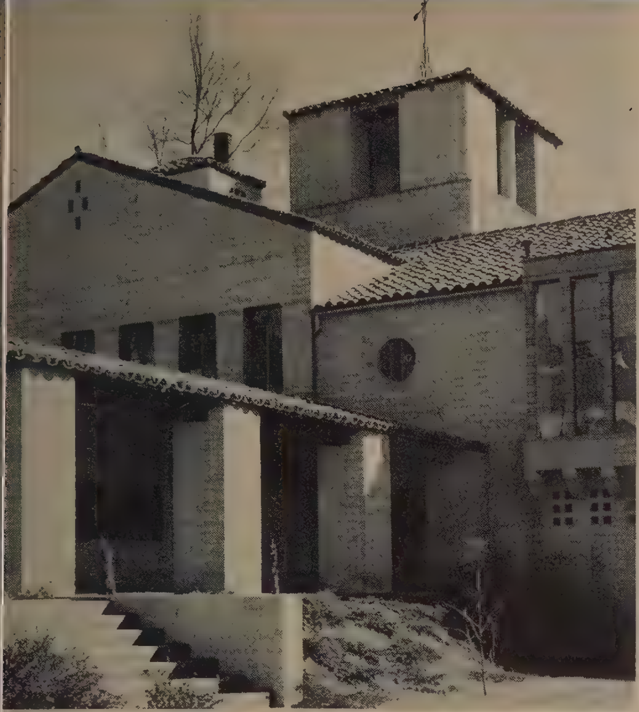
Dirty forms were taboo on this job. Before succeeding runs of concrete were placed, forms were scraped clean of any dried concrete that had accumulated on them.

Mixes were carefully checked to be certain the water-cement ratio was maintained constant. This permitted higher strength concrete and also a better finished surface. An unvarying density was the aim. To assure well puddled concrete, no less than one tamper was required for each two cubic yards of concrete placed per hour. To further assure proper compaction mechanical vibrators were placed directly in the concrete for a period of between 10 and 30 seconds in each location depending upon the consistency of the concrete. The construction joints were limited to as few as possible and it was insisted that they be made perfectly straight wherever they were visible in exterior walls.

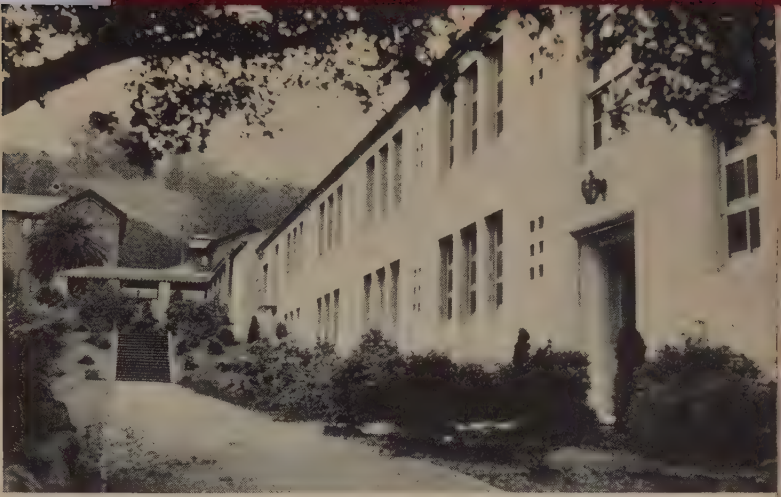
For plain wall areas where board marked surfaces were the rule, 1-in. maximum size aggregate was used. For ornamental work somewhat smaller sizes were used and special care was taken that molds were completely filled.

Following removal of forms, a careful plan was followed for curing the concrete. Both sides of the walls were thoroughly wetted night and morning for ten days after placement.

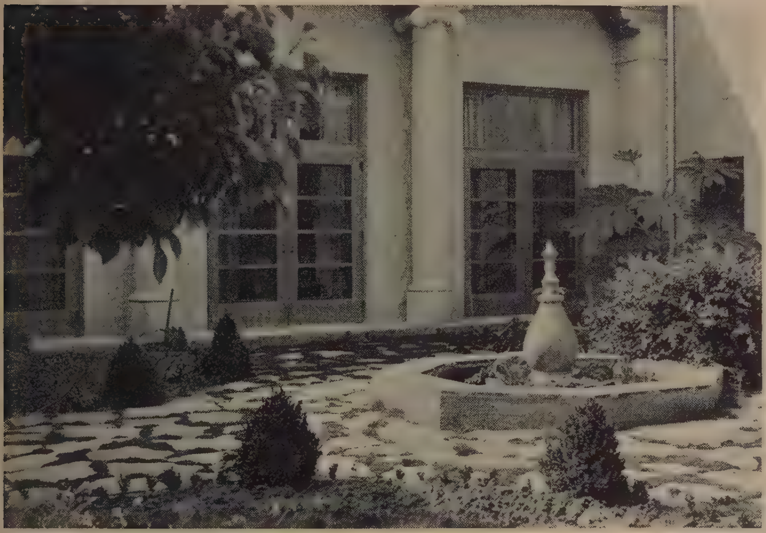
The finish surface of the concrete throughout the structure was two coats of cement paint, sprayed on at 24-hour intervals. This treatment did not obscure the texture left by the rough form lumber.



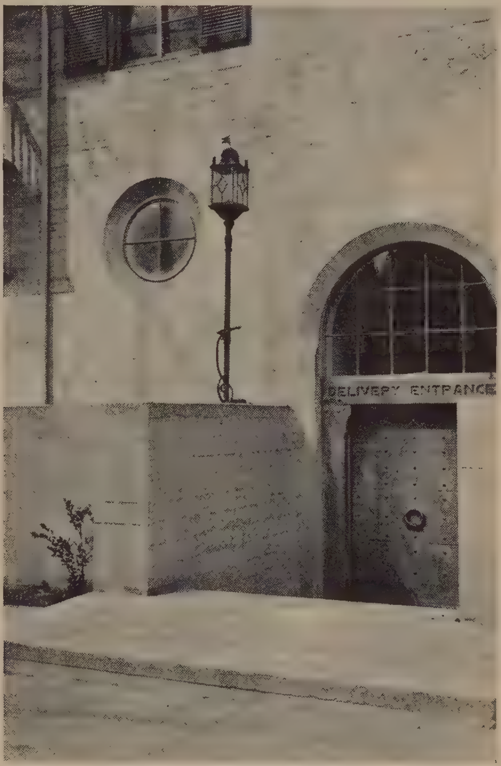
Corner boys' and girls' dormitory.



Front elevation of primary school.

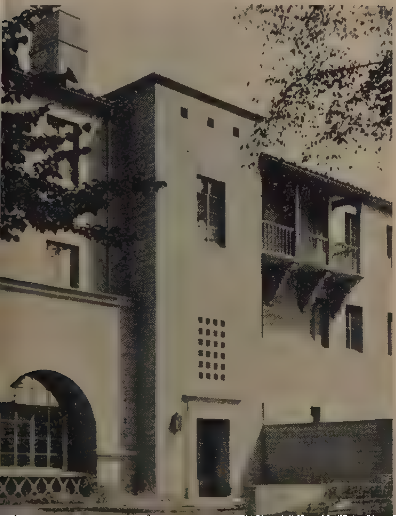


Garden detail in School for Deaf.

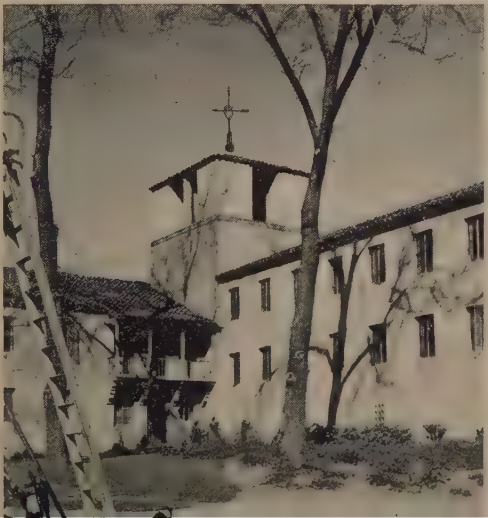


Delivery entrance—boys' dormitory.

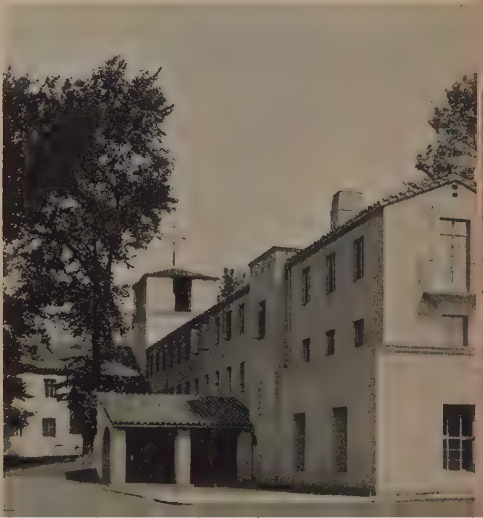
Side elevation—girls' dormitory.

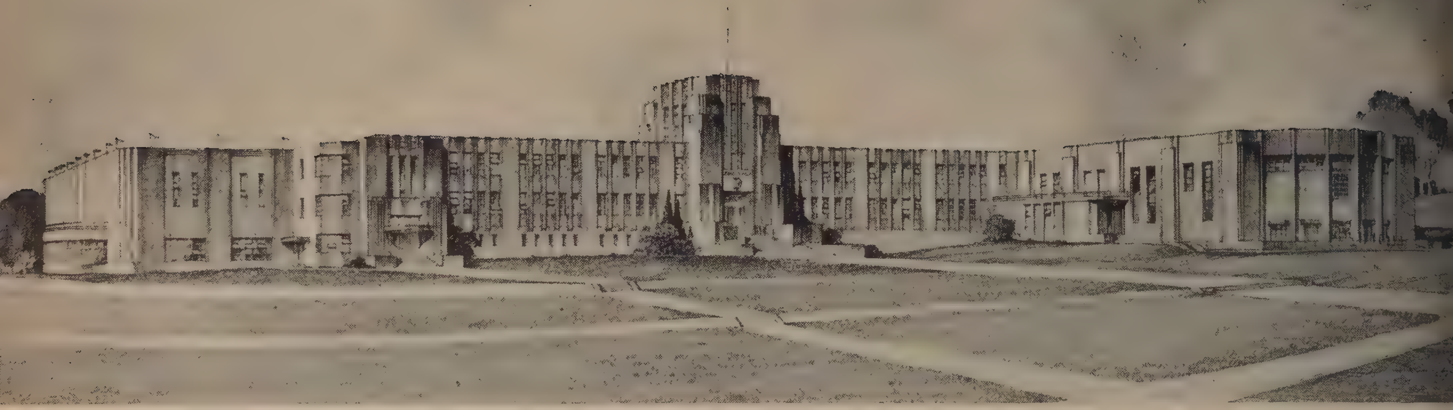


Dormitories—view from playground.



Entrance to boys' dormitory.





Proposed new Junior High School at Jackson, Miss. This modern structure will be built of architectural concrete. See ground plan below. N. W. Overstreet and Town, architects, of Jackson.

Jackson, Mississippi

Plan Two New

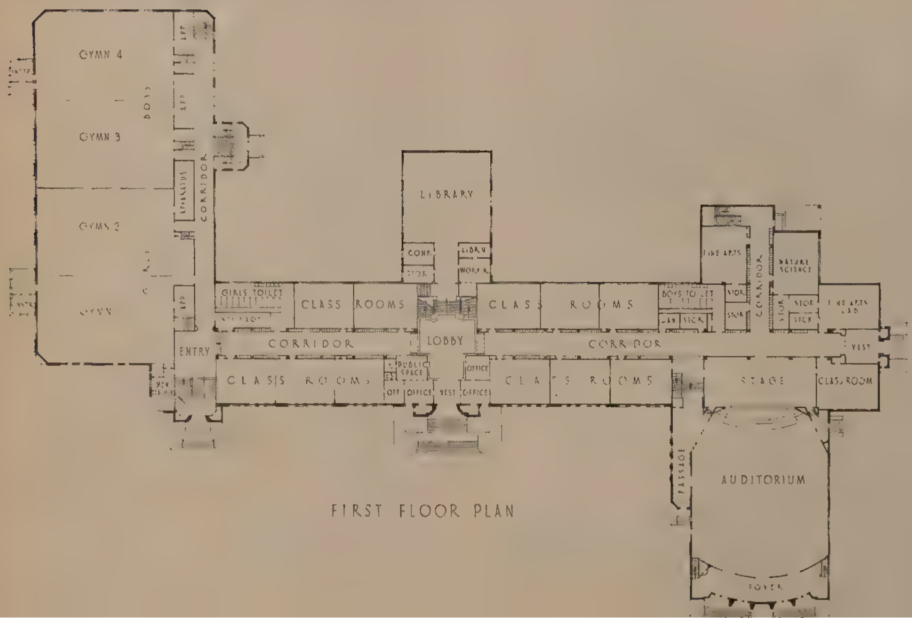
By A. Hays Town

NEED for immediate relief from overcrowded conditions in Jackson, Miss., schools has won wide civic support for the proposed new Junior High School, some of the plans for which are reproduced on this page. The new school is being designed by N. W. Overstreet and Town, local architects.

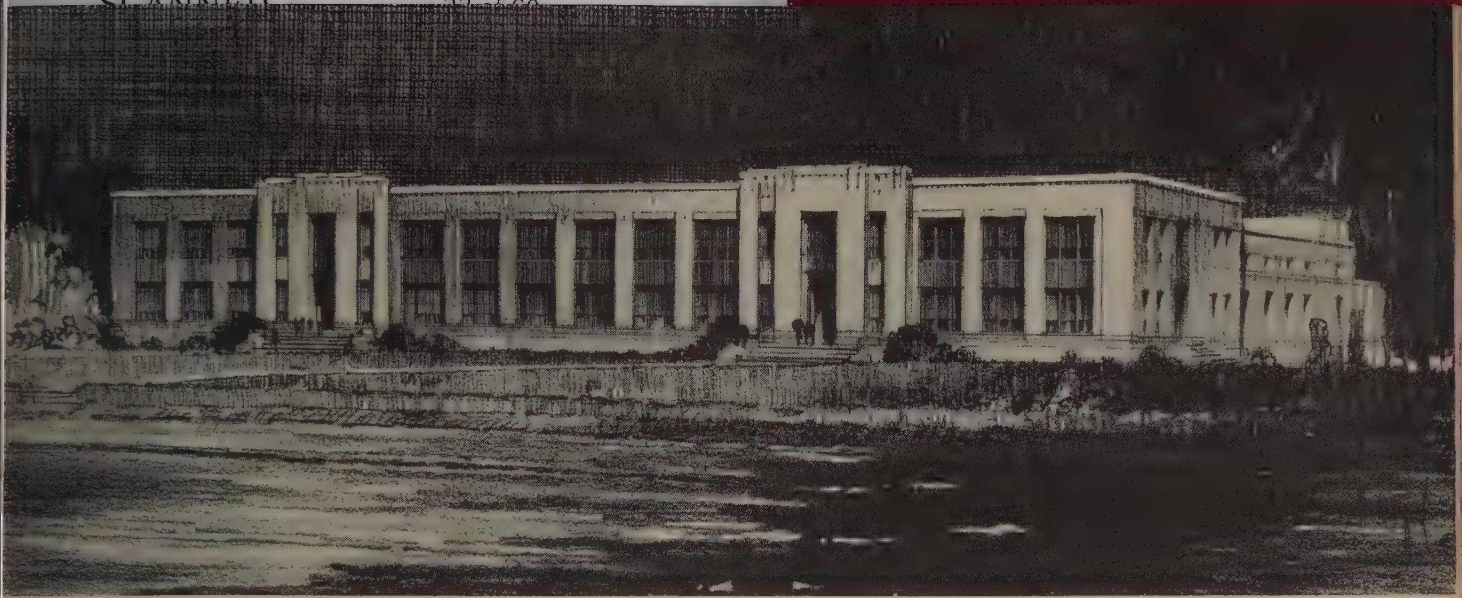
Shaped somewhat like a "Z," the new building will be 412 ft. long by 304 ft. in depth overall from outside of the auditorium (at right) to the outside of the gymnasium wing (left). There will be 21 classrooms, an auditorium seating 1,200, home science department, four natural science rooms, two fine arts rooms, one fine arts laboratory, science laboratory, chorus room, visual education room, piano and practice rooms, band practice rooms, library, gymnasium with four playcourts and bleacher space, locker rooms, manual arts laboratory, and a cafeteria with 400 capacity. The school is designed for 1,100 students.

Construction will be entirely monolithic concrete for exterior and interior walls, foundations and floors. Wall texture for exterior will be smooth such as that made with form liners in large panels. Interior finish will be portland cement plaster.

The choice of concrete as the structural and enclosing material for this building was made not only for economy but to follow closely the spirit and style of the design. It was felt that this type of structure typifies the progressive and modern spirit of a young and hustling city such as Jackson.



FIRST FLOOR PLAN



Perspective of proposed Northwest Junior High School at San Antonio. This new school was designed by Ayers and Ayers and Adams and Adams, associate architects, and Phelps and Dewees, Board of Education architects.

Schools for South

San Antonio, Texas

By Robert M. Ayers, A. I. A.

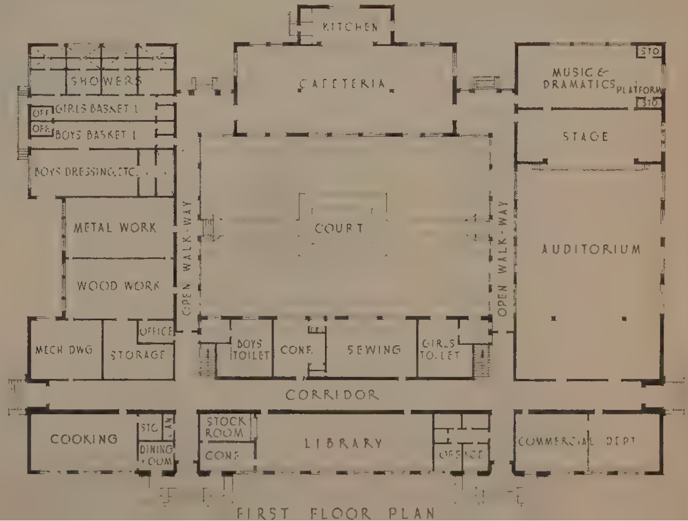
THE newest addition to the San Antonio, Texas, school system is still a matter of plans and details, but there is every promise that construction work will start within the next few months. The new school, to be called Northwest Junior High School, is being designed by Atlee B. and Robert M. Ayers and Adams and Adams, associate architects, and Phelps and Dewees, architects for the San Antonio Board of Education and Matthews and Keenan, structural engineers. It will be located on Huisache Street, facing south.

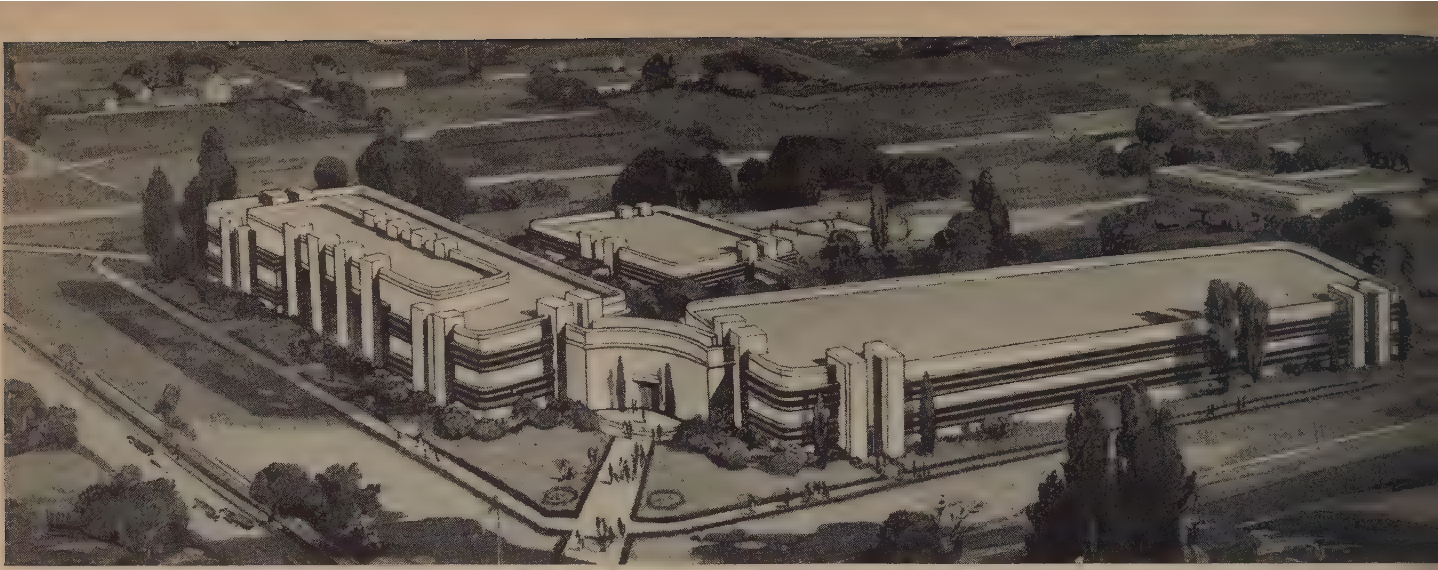
It is a modern type design with long, flat roof line. It's exterior wall treatment has quite a pronounced vertical feeling, with wide window areas on all elevations. Usable space will be basement and two stories above ground.

Northwest Junior High will contain 22 teaching stations —lecture and classrooms—and in addition will have special rooms for dramatic art, science, library, metal and wood working department, physical education, cafeteria and an auditorium to seat 850 students. The auditorium and various other rooms will open onto an attractive court which will be landscaped with tropical plantings, ornamental fountain, and other garden specialities. The feature of this court, however, will be an open air stage suitable for plays, pageants, concerts and school assemblies.

After considerable discussion and a thorough study of the project, it was decided by the architects and recommended to the Board of Education, that this new school be built of reinforced concrete with architectural concrete exterior. The appropriation available for this structure is limited, and it was found that adoption of this type of construction would result in a substantial saving over the use of masonry construction ordinarily used in San Antonio school buildings.

But, aside from cost considerations, it was the architects' feeling that this particular type of structure, with its continuous lines and simple integrated ornament of the modern style would lend itself in design more readily to architectural concrete than to any other material.





Plan perspective of new Jefferson High School at Los Angeles. Frankly modern, it was designed by the firm of Morgan, Walls and Clements, Los Angeles architects.

A Modern High School

By Stiles O. Clements, A. I. A.

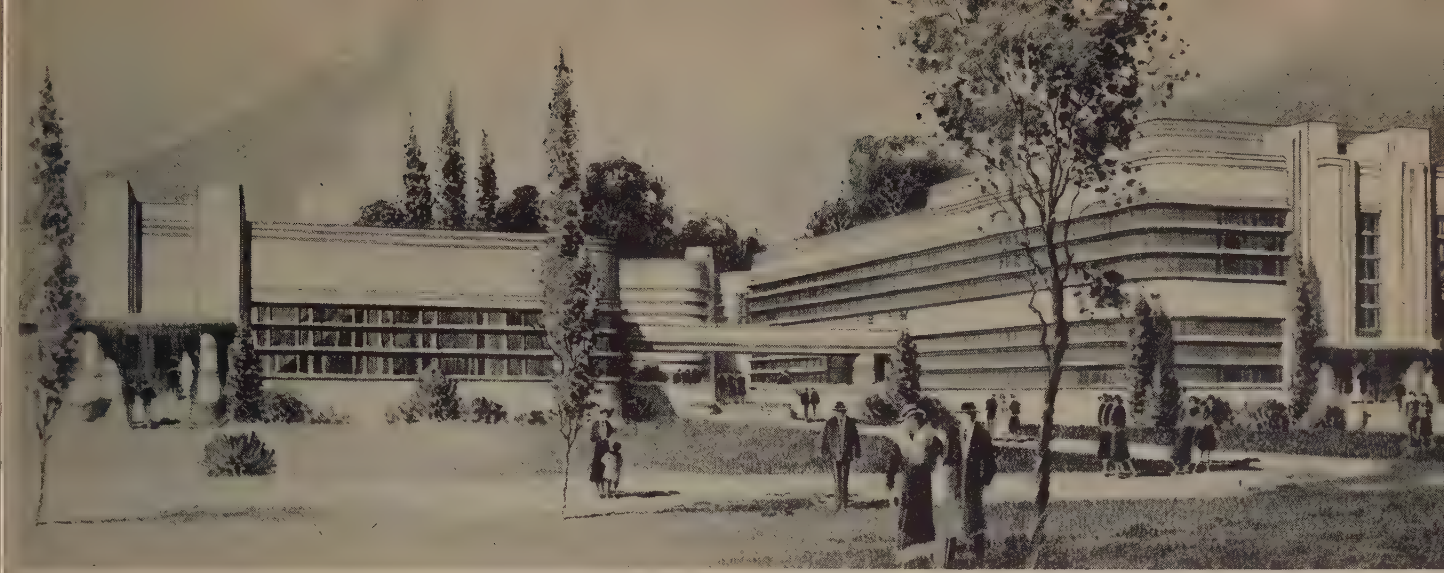
DID the forms significant of modern architecture serve no other purpose than to decorate the urban landscape, it would be foolish for designers to expend the thought, imagination and energy required to create them. It is far simpler to adopt some familiar style, whose esthetic qualities have not been questioned for ten centuries, for the structure intended only to give passing pleasure to people hurrying from one mundane task to another. But we are beginning to recognize that most buildings are erected to perform some very definite function. The school building is one of them.

It was not until sometime in the past two decades that we ceased thinking of the school as a monumental structure, ranking in austerity with churches, memorials, mausoleums and Civil War monuments in the public squares. Reluctance to give up that idea is pardonable. Universal education, being a rather new aspect of civilization, was compelled to turn to medieval scholasticism as a model for its philosophies and traditions. Thus the ivy covered, school building is a throwback to a time when learning was the special and selfishly guarded province of the monks who poured over books in cells and cloisters, growing pale, blind and noble under flickering candlelight.

Industrialism, being much older, and until recently a more respected institution than education, meanwhile advanced much farther in its architecture. It was found that workers could do more and better work if they had plenty of light and good ventilation; hence the majority of factories became functional units built for the purpose of getting something done at a minimum of cost and a maximum of health, comfort and safety.

The school is no factory, but it should be a place where something can be done efficiently with all the factors of health, comfort and safety incorporated to a higher degree than in industrial plants because children are more delicate and more sensitive than adult laborers, white collar workers and executives. That is why the modern school which shelters many functions and operations should be built for production of intelligent, healthful minds. If the functional school seems to look as clean, light and airy as a modern automobile plant this should not be held against it. The esthetics of anything that is honest, well ordered and expressive will assume reasonable acceptance in the mass mind as soon as the mass mind has had a chance to understand.

The design of the buildings for the reconstructed Jefferson High School in Los Angeles is modern and functional in plan treatment, exterior design, structure and mechanical equipment. The general layout of the building includes three units: administration, academic and cafeteria buildings. The administration and academic buildings front on two intersecting streets and are connected with the cafeteria building at the rear by covered passageways. The administration building shelters offices, a large library and nine classrooms. The academic structure contains classrooms for bookkeeping, office practice, typing, nursing, cos-



Detail of rear elevation of cafeteria at left and academic building at right. The windows are continuous around all walls of the buildings. Strong pilasters and horizontal metal fins on windows are the only ornamental detail.

metology, sewing, biology, chemistry, physics, music and other subjects. In the cafeteria building are dining rooms for students and faculty, kitchen, and a domestic science classroom.

The plan is orientated so that almost every elevation of the structures will derive direct sunlight at some time during the day. In designing the exterior of these buildings, simplicity born of function and purpose, has been the chief aim. The wall surfaces have no decoration whatever. Vertical pylons at certain points and the use of sheet metal horizontal fins at the windows are sufficient to give necessary interest to the design.

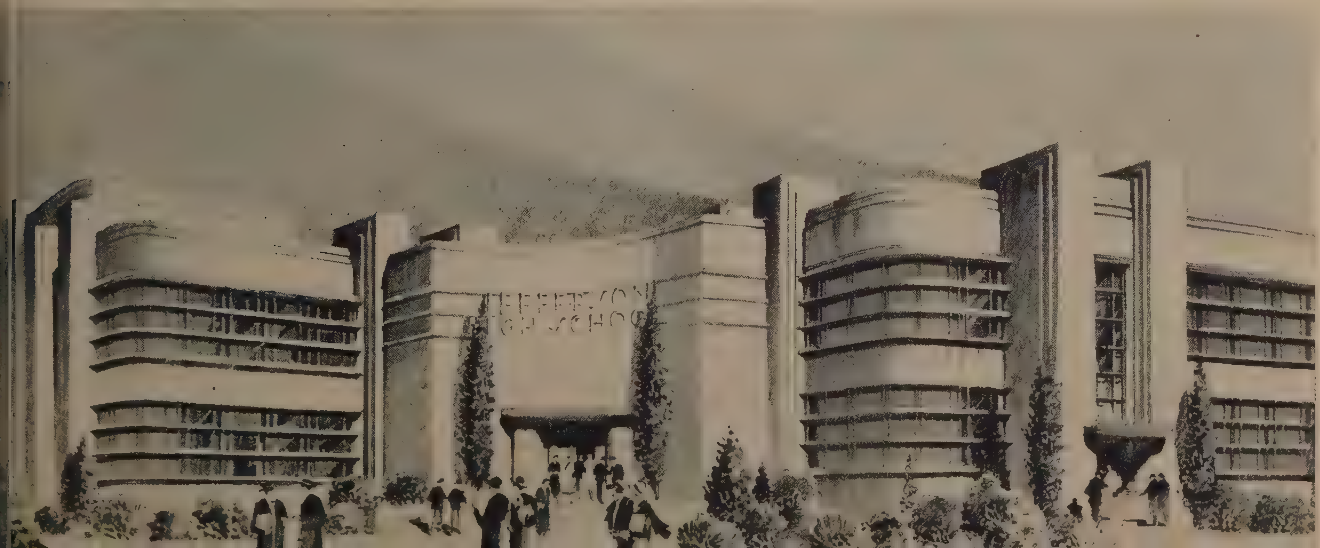
The windows are continuous around all of these buildings, allowing maximum light and ventilation in the classrooms and maximum flexibility in the location of partitions between classrooms. With this window treatment, it has not been necessary to line-up first and second story partitions with each other. The practical nature of this arrangement is obvious. Different rooms are used for different subjects, require different equipment and varying amounts of space. The space saved by thus utilizing all areas without having to conform to the exterior design, is considerable.

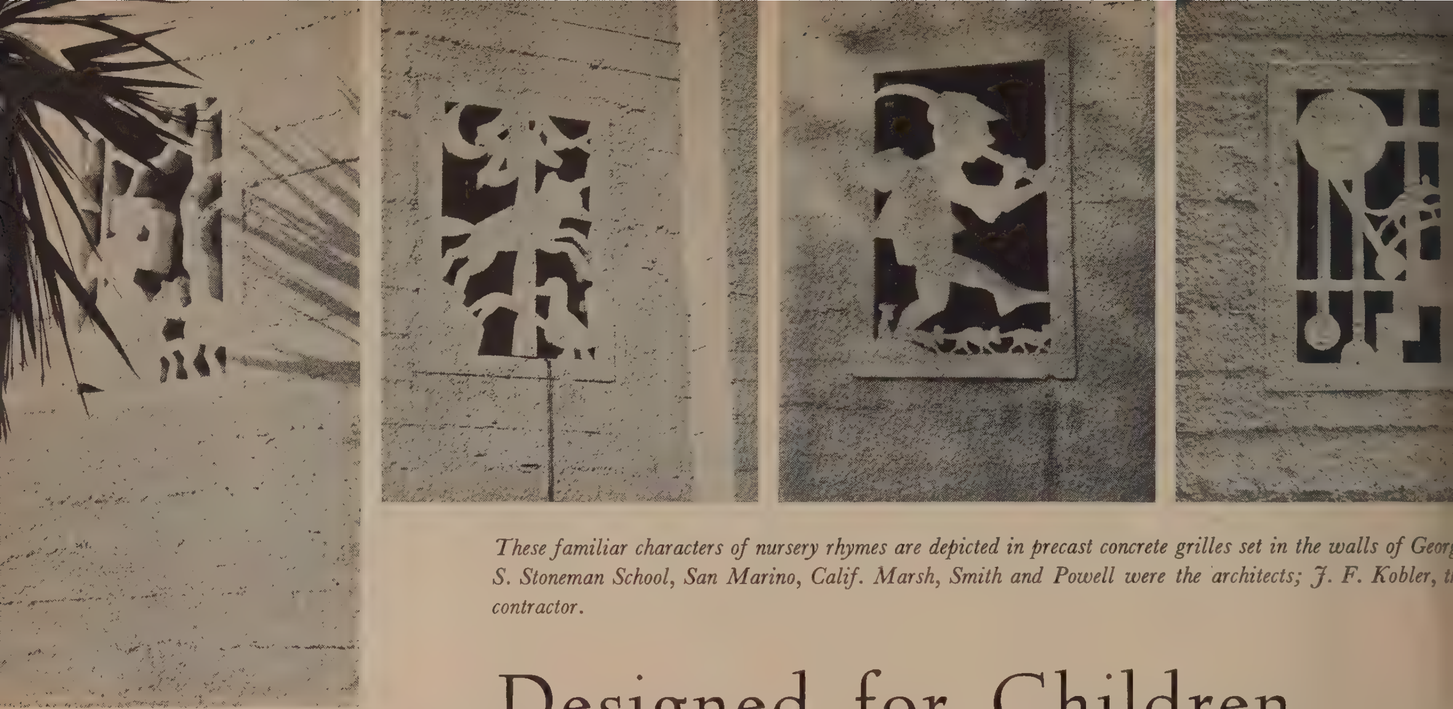
Reinforced concrete was selected for these buildings as the best type of construction to meet state and local earthquake laws governing school buildings. This material also performs the architectural service of enclosing the practical layout of the structures in a medium which completely and honestly expresses the design.

The administration and academic buildings are two-story reinforced concrete skeleton frame construction, with reinforced concrete joist floors and roof. Foundations are of the continuous reinforced concrete type, except in special cases where individual spread footings are used. The concrete floors and roof are designed to act as horizontal diaphragms, transferring earthquake forces to cross walls parallel with lines of earthquake shock.

The cafeteria is a one-story structure with reinforced concrete exterior walls and wood roof, supported on steel trusses. The floor is reinforced concrete joist construction. Earthquake forces here are transmitted to the exterior walls by a horizontal bracing system in the plane of lower cord of steel roof trusses.

Detail of entrance between academic and administrative buildings. The structures forming this new school are orientated for the best possible light throughout the day. This window arrangement allows maximum flexibility in location of partitions.





These familiar characters of nursery rhymes are depicted in precast concrete grilles set in the walls of Geor S. Stoneman School, San Marino, Calif. Marsh, Smith and Powell were the architects; J. F. Kobler, t contractor.

Designed for Children

By Norman F. Marsh

DESPITE nostalgic references to those "good old golden rule days," few would admit that the process of getting an education in their childhood schools was very happy or that it aroused burning interest in intellectual achievement. Fundamental information was impressed upon youth with the hickory stick, and ignorance was rewarded with the dunce cap. Truth and beauty were so often mixed with pain and chagrin that hatred of school was a sincere and justified tradition, even up to comparatively recent years.

We have more civilized methods today. Instead of employing coercion, we train our youth by exposure—to fancies and facts glamorously presented in a happy, congenial and cultural atmosphere. And while these methods may not produce an era of mental giants, our children will be happier, healthier, more reasonable and better educated adults than we are.

One of the important factors in the modern ideal school is the school building. It is no mere shelter. It is a combination of home, playroom, theater and workshop. For many children (from underprivileged classes) it is the only place where they come in contact with beauty, cleanliness and other necessities of decent living. The school building, then, should offer the healthful and inspirational qualities of all the institutions its cultural training represents.

It was this line of thought, less sketchily conceived than outlined above, with which the architects undertook their preliminary studies of George S. Stoneman School at San Marino, California. It was to be an elementary school for pupils of kindergarten age up to the fourth grade, to contain from six to nine classrooms especially adapted to the ages of children using them; administration rooms, cafeteria and kitchen, corridors, arcades, cloakrooms and toilets to meet space needs. Other requirements were for maximum protection against fire and other elemental hazards and construction at a cost in keeping with the budget set aside for the project.

As Stoneman school was finally designed and built, it has reinforced concrete walls with a tile roof on built-up wood trusses. It is roughly "L" shape in plan, rambling informally over generous grounds. Its architecture is indigenous to the location and is modified Spanish-Californian; but its decorative motif represents no time, no place and no style.

The silhouetted panels which decorate the walls of Stoneman school come from Mother Goose nursery rhymes, from fairy tales and other sources in the vast mystic lore of childhood. Little Bo Peep, the Mouse that Ran Up the Clock, the Fox and the Goose, the Cat and the Fiddle, the Pied Piper of Hamlin, are not mere decorative grilles to intrigue the fancy of small children. They represent the first approach to literature, the first interest in wanting to read and learn more that is so essential in elementary teaching. They are a constant reminder that the school was built for them to enjoy, not to confine them in bleak, too matter-of-fact surroundings.

The windows of this school are large, and they are set low in the walls. Why should small children be deprived of the vision of outdoors? Why should discipline and attention be forced by high, narrow windows? They learn through curiosity that is informed, not denied or evaded.

The concrete walls were cast in square edged, rough lumber forms. The interesting form marks were not concealed by the tan-colored dash coat of portland cement stucco which was later applied to the concrete walls. Rather, they reveal the scale of this low lying structure and form a setting for the shadows which play upon its walls.

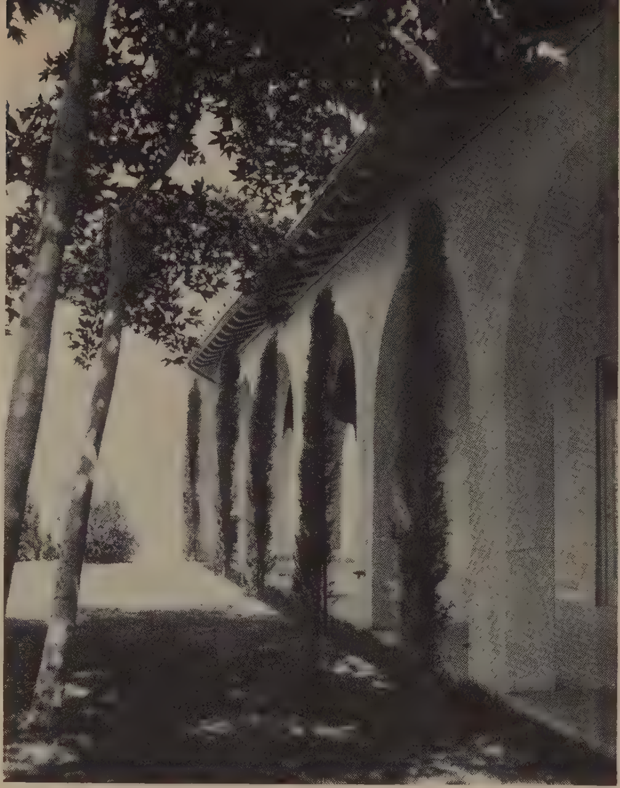
The nursery story grilles are of precast concrete, fabricated in wood and plaster waste molds. They were set into the wall forms when they were erected and the concrete was cast about them. They, too, were given the dash coat of stucco with the result that they now have a fabric-like texture.

A combination corridor and arcade runs the entire length of the building. Arches open onto playgrounds and garden patios which have been beautifully equipped and landscaped.

The fire safety of Stoneman school is provided by concrete walls throughout and the structural concrete floor which was used throughout the entire building. The walls in general are 12-in. thick, excepting certain corridor walls which are 8-in. thick. The floors of all corridors and arcades consist of structural slabs on fill. All other floors are of pan joist construction, using 20-in. pans.

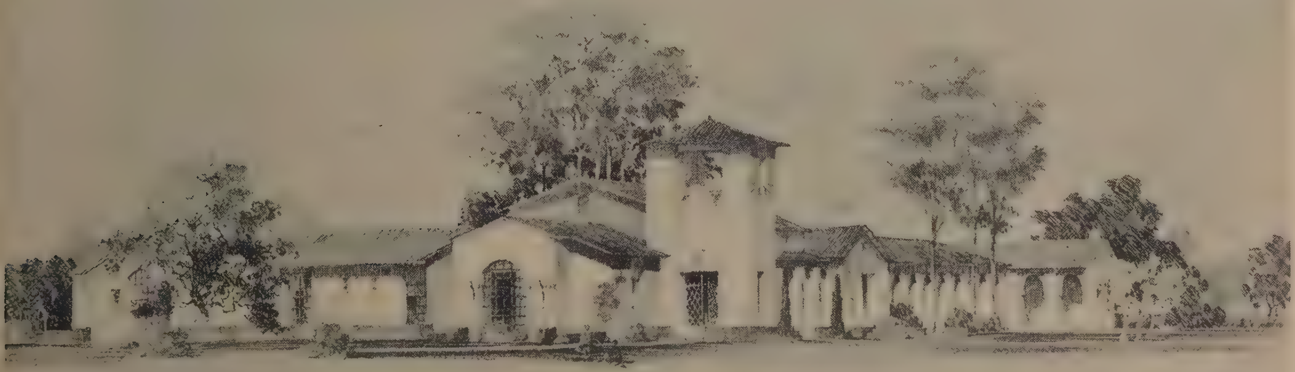
With plan dimensions of 234 ft. by 132 ft., this school contains slightly over 275,000 cu. ft., ample area and cubage for healthful occupation by active, growing children.

The economy of this construction may be judged by the fact that the total cost of the contracts, general, electrical, plumbing and miscellaneous was $67,031 or a unit cube foot cost of about 24 cents. Since the contracts were awarded in December, 1929, when costs were practically at their peak, this figure is most reasonable.

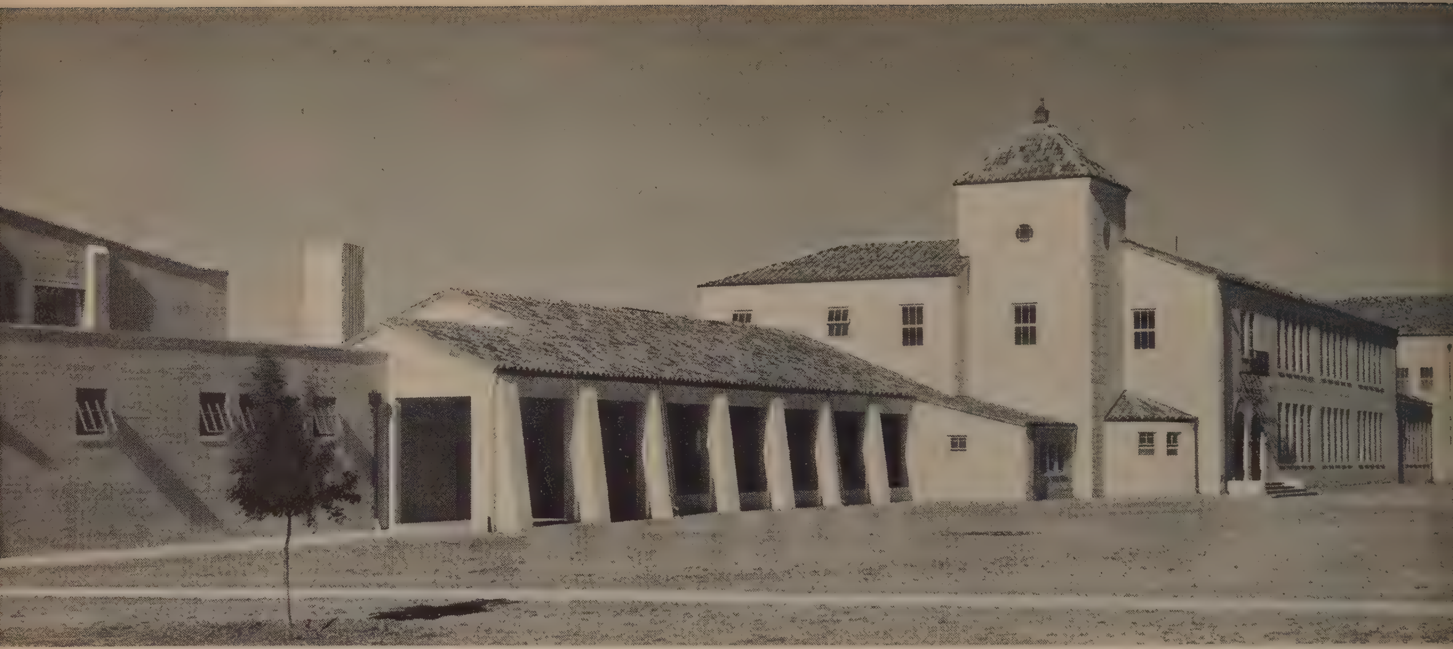


Charming patio at the side of one of the arcades. The building has reinforced concrete walls with a finish dash coat of tan colored cement stucco. Marks of form boards are visible beneath the stucco.

With regard to Stoneman school's resistance to earthquake forces, an examination by the State Department of Architecture following the Long Beach earthquake, revealed that a small job of strengthening roof framing and connections was all that was necessary to make the structure conform to the new state requirements for school buildings.



Architects' perspective of Stoneman School, reveals the rambling nature of this pleasant, low-lying structure. No photograph can show this view of the school on account of trees which surround the building.



Grant Union High School, North Sacramento, Calif., recently constructed of architectural concrete, comprises three units separated by arcades. Harry Devine, architect, and Azevedo Construction Company, contractors.

Grant Union High School

By Harry Devine

SEPARATION of the various functional units of the school building seems to be a marked trend in school architecture all over the world. This is being done mainly to eliminate conflict, noise and confusion within a building which shelters a variety of simultaneous activities ranging from boisterous play in the gymnasium to deep brown study in the recitation room. But there are other advantages: the spread-out arrangement increases the number of areas exposed to natural light and ventilation; permits a wider distribution of safety exits, and provides many opportunities for interesting architectural treatment and landscaping effects.

Grant Union High School at North Sacramento, Calif., completed this year, segregates the school functions entirely. The building is basically three separate units, connected by wide halls and arcades. The auditorium, seating 1,000, is located at one extreme and the gymnasium is at the other. Between them, easily accessible to each, is the administration and academic unit, containing 20 well-lighted classrooms and offices.

The architectural style is early-Italian, expressed in exposed reinforced concrete. The exterior walls reveal the marks of the form boards through a white stucco dash coat. In most cases, interior walls are treated with a dash coat of acoustical plaster. Certain areas, however, have been decorated with colored stains and stencil work applied directly on the exposed concrete.

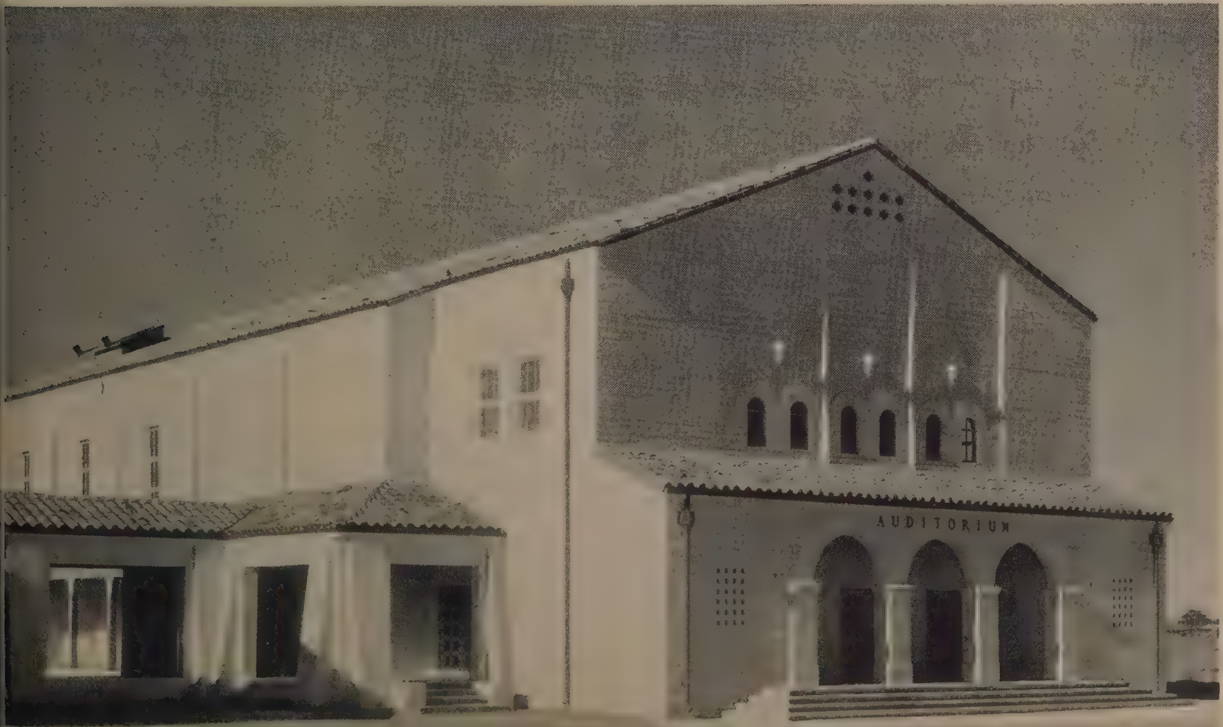
Shiplap forms were used throughout the building without any attempt to conceal jointlines. The concrete used in the construction was a sound, dense mixture in which the water-cement ratio was carefully controlled at all times. The uniformity of the exposed surfaces, the result of skilled craftsmanship and rigid inspection, may be seen in the photographs taken soon after the completion of the job.

Grant Union High is the first major school in this section of California to be designed and built to conform to the Field Act, which provides that all school buildings be designed to withstand earthquake stresses. These requirements were met easily since the reinforced concrete walls and floors produce an integral, rigid structure.

Plans for this school were first practically completed for masonry construction, but changed later to monolithic concrete as being much more economical. An additional reason for this change was that concrete, used architecturally, could produce the desired texture and color, both of which are popular and appropriate in this part of the state.

Tower and entrance to classroom unit of Grant Union High School. The form marks of the monolithic concrete walls may be seen through the white dash coat of portland cement stucco.

Below—arcade and entrance to auditorium. The separation of gymnasium, classroom and auditorium units is intended to provide greater efficiency in the use of each. This is consistent with new thought in school design.



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Typical of the uses of architectural concrete for school facilities is this Observatory of the University of Kentucky, built in 1931. Occupying an impressive site on the campus at Lexington, this strictly functional building was designed by Hugh Meriwether, Lexington architect, for requirements specified by Maury Crutcher, superintendent of buildings and grounds of the university. General contractor for the project was W. T. Congleton and Company. Mechanical equipment used for observation and teaching astronomy was designed by Towner-Sellow and Associates of Middletown, Conn.

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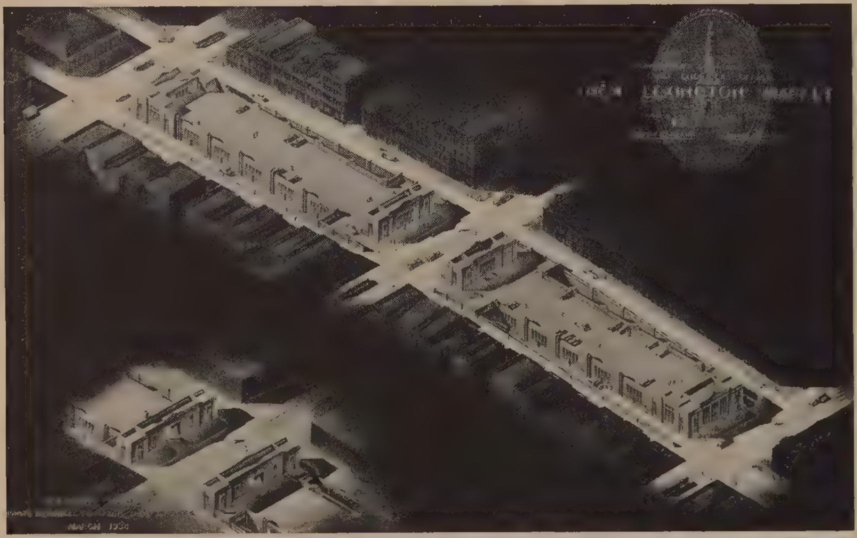
market building at an elevation 15 ft. above the ground level of the market, permitting the entire length of the main floor to be on a continuous level, and also providing entrances and exits to the roof parking areas on both sections of the structure (see cut).

Lexington Market is designed for reinforced concrete throughout, with architectural concrete exterior to be obtained by the use of plywood form liners. Floors of the stalls are concrete with wood lattice platforms. All public aisles are terrazzo. The interior, as planned, presents a glistening array of white columns and straight lined aisles. White cement painted interior walls and white enameled stalls will complete the effect of clean tidiness aimed for throughout the market.

Orders to market dealers will be delivered through doors suitably placed along the service drives so as not to interfere with traffic and also through six plunger-type electric elevators running from street level to basement where all vegetables will be cleaned.

The roofs of the market buildings will provide a parking area of about 29,000 sq. ft., accommodating about 160 autos of the heaviest limousine type. The structural members supporting the parking areas, of course, are reinforced concrete. The parking area will be divided into two sections accessible from either side of Paca Street. An adequate curb and parapet will be an integral part of the design of the parking areas, both for the sake of safety and appearance.

Preliminary plans showing in detail the various features of the proposed structure were



Plan perspective of New Lexington Market, Baltimore, Md.

prepared in the Bureau of Plans and Surveys under the personal supervision of Frank K. Duncan, Assistant Chief Engineer, at the request of B. L. Crozier, Chief Engineer of the Department of Public Works.

ARCHITECTURAL CONCRETE is indebted to Frank O. Heyder, Senior Architectural Draftsman, Bureau of Plans and Surveys, who has been closely associated with this project, for the interesting information reported here.

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New Book from Japan

Modern, functional, international—whatever one wishes to call the current world trend in architecture—is the accepted style for almost all construction in Japan. There are many reasons for this and style is not the important one, although Japanese taste for centuries has prescribed a more strictly functional type of architecture than has been in vogue anywhere else in the world. The real reason is that Japan is using simple, practical designs and modern, rigid materials for economy, efficiency and to keep her homes and buildings from tumbling into ruins whenever an earthquake rocks the islands. And any architecture in which the structural features are dominant rather than obscured, can be nothing more or less than modern as we know it today in this country.

You will believe this if you study the works of Antonin Raymond, one of the foremost architects in Japan, published this year in a profusely illustrated book edited by Katsuya Nakamura and published in Tokyo by Johnan Shoin. The book, *Antonin Raymond—his works in Japan, 1920-1935,* with text in English, French and Japanese, may be purchased in the United States at the offices of *Architectural Record.* It is worthy of careful study.

Mr. Raymond, born in middle Europe and educated in America, took a heritage of the modern manner to Japan when he went there to work. By his own admission, however, he has been largely influenced by Japan, its own native architecture and what the nation has been compelled to do since the terrible quakes of 1923 practically levelled Tokyo to the ground.

Three-quarters of this interesting book is devoted to photographs, models and sketches of Mr. Raymond's buildings, shown in chronological order from 1920. They represent all types of structures—schools and colleges, modest houses and villas for the nobility, office structures, hospitals, country clubs. Some of the smaller buildings are wood construction, but everything else is steel and reinforced concrete.

Architect Antonin Raymond and some of his Tokyo associates.

Mr. Raymond has little patience with imitation. He makes his wood structures look like wood, his steel buildings show steel and his concrete structures completely reveal the material he is using. Honest use of a material, he maintains, is as much a part of good architecture as form, line and mass. What he means by this is apparent in the handling of each of his structures illustrated in the book.

An article by Mr. Raymond describing his theories and practices in relation to some one of his recent projects, will be published in an early issue of ARCHITECTURAL CONCRETE.

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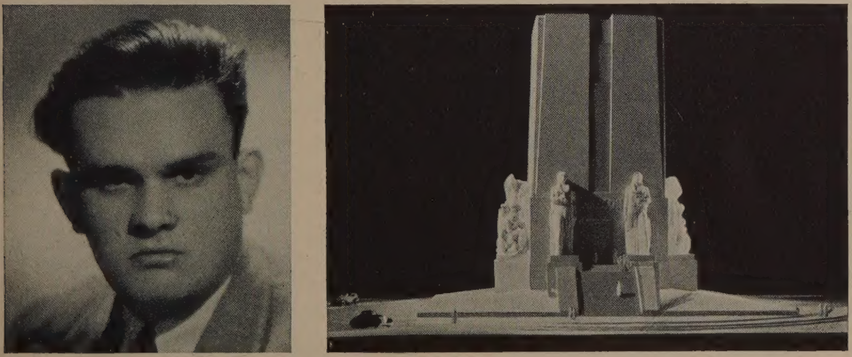
Obregon Memorial

Patriots, gathered in La Bombilla Park in Mexico City last month, gazed in awe at the impressive memorial they had come to dedicate to the late martyred President-General Alvaro Obregon. The monument, tall but massive with heroic sculptured figures its only exterior decoration, is a strictly modern memorial and it is the first structure of its kind in which architectural concrete has been used in Mexico.


Architect Echeagaray . . . and model of Obregon Memorial.

Credit for the design of this structure goes to a young architect in Mexico City who is acclaimed by his fellow citizens. He is Enrique Aragon Echeagaray, graduate of National University of Mexico in 1929, whose design for the memorial structure was selected in a competition open to Mexican architects.

For a feature of next issue of ARCHITECTURAL CONCRETE, Senor Echeagaray has written an interesting and comprehensive article describing the development of the design and the construction of the Obregon Memorial. The article will be accompanied by numerous photographs, sketches and reproductions of models used to study the design.

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Pardon Please

In last issue we made three errors which we will try our best to get right this time:

The name of Unity Synagogue was some time ago changed to Mt. Neboh, and the architect is Walter S. instead of Walter B. Schneider.

The Ford music pavilion at the current San Diego Exposition is not all monolithic concrete. The bowl is, but the stage and shell are wood frame construction with plaster finish.

We inadvertently omitted that Messrs. Paul Richardson and Joseph Wilson were associate architects with Mr. Albertson on St. Joseph's Church.

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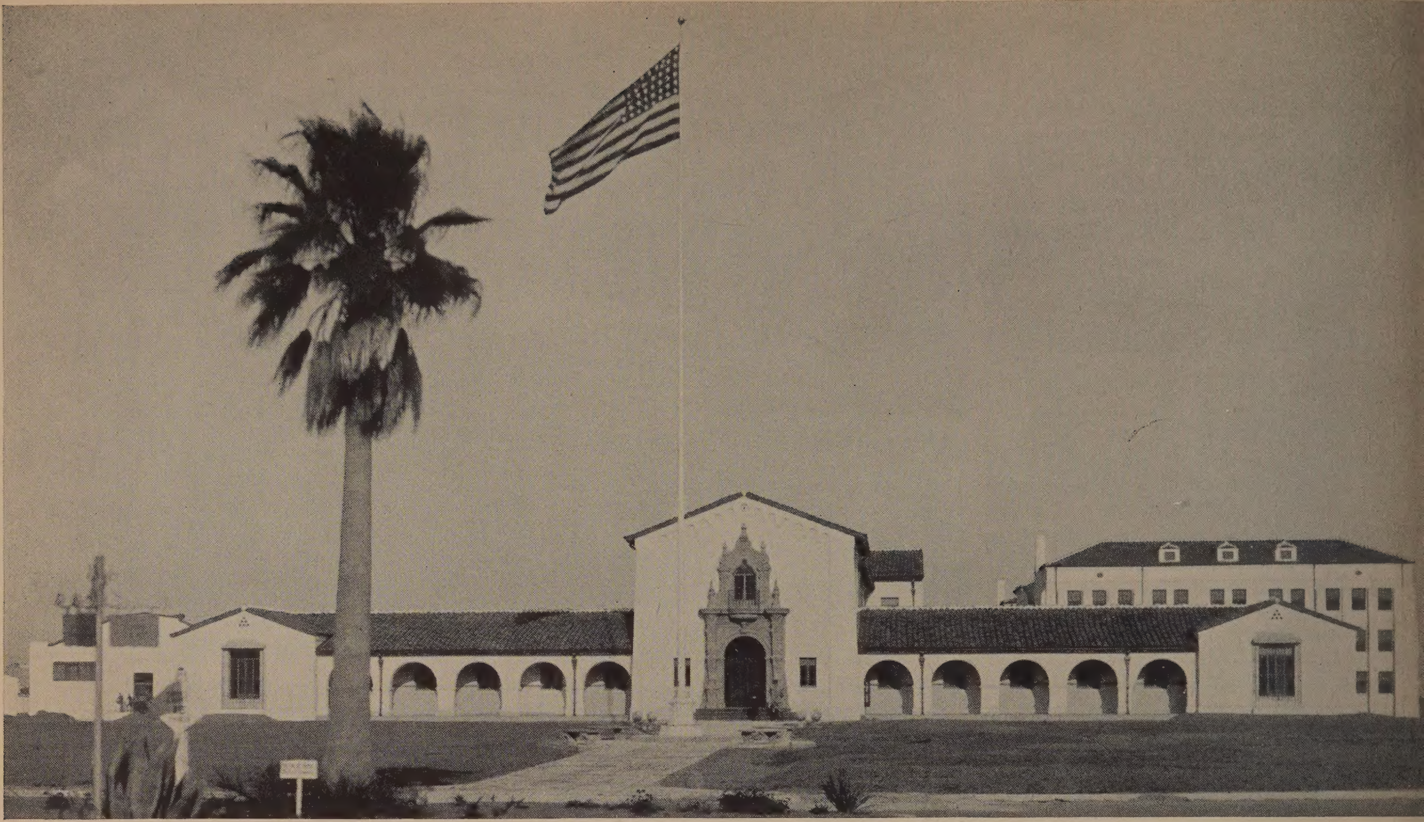
Despite the extra page we wangled out of the boss for File 10-7-1, there was too little space for all of the fine things we wanted to print here this time. Next issue will probably be just as crowded since it will be devoted to as many new construction jobs as we can stuff into these too few pages. Au revoir.



Administration building, one of the 27 reinforced concrete structures at Hamilton Field Air Base, San Marino County, Calif. The group was designed by the Quartermaster Corps, under the supervision of Capt. H. B. Nurse, assisted by civilian engineers under the direction of F. W. Salfingere. (*Photographs by Signal Corps.*)

Hamilton Field Air Base

By J. E. Jellick*

WERE all of its airplanes grounded, Hamilton Field, newest U. S. Army Air Base, would present no warlike appearance. The casual observer might mistake it for a peaceful Spanish village or a typical California subdivision with gleaming white homes and community buildings, and with quiet streets winding over pleasantly wooded hills. But, this serene community quarters scores of fighting ships, 140 commissioned and non-commissioned officers, and 800 enlisted men; and its strategic location—midway between the Canadian and Mexican borders and inland just beyond battleship gun-range—makes it one of the most important links in the Pacific Coast defense.

When Hamilton Field was garrisoned last December as the 7th Bombardment Group, the occasion marked the near completion of a project which included the reclamation of swamp waste-land on the shores of San Pablo Bay, and its conversion into what is reputedly the nation's finest air base. The work involved extensive design and construction activity which was brilliantly carried out under the supervision of Captain H. B. Nurse of the Quartermaster Corps, assisted by a staff of civilian engineers headed by F. W. Salfingere.

Appropriately, the architecture of the residential and technical structures at Hamilton Field is early Californian. But unlike the usual army post where all buildings more or less conform in monotonous regularity of size and shape, the buildings here present a variety of individual and pleasing designs aimed to combine comfort and utility.

The technical area comprises 27 buildings, chief of which are the Administration building, three story barracks buildings, warehouses, fire and guard house, a theater, photographic laboratory, Air Corps shops and eight hangars. All of these structures are of reinforced concrete with the exception of the hangars which have monolithic concrete walls with steel trussed roofs.

Owing to the character of the soil, all of these buildings are supported on pile foundations—the shorter piles being precast concrete, and the longer ones a combination of wood below, and concrete above, the ground water level.

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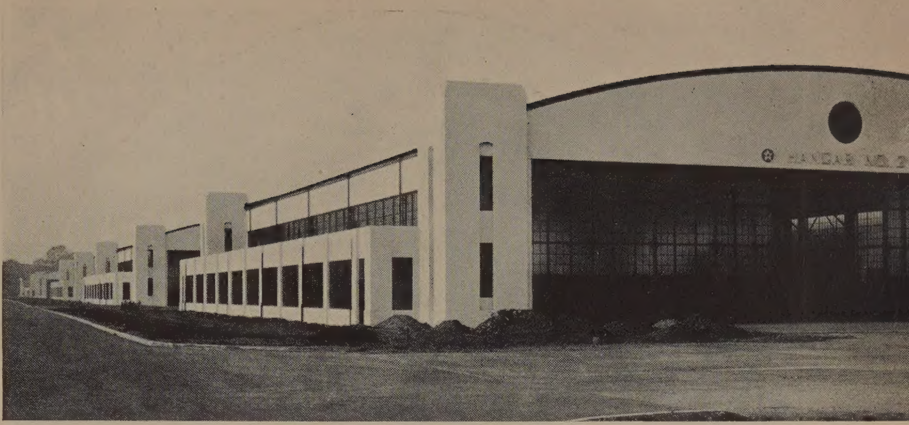
*District Engineer, Portland Cement Association, San Francisco.

At the beginning of the job a complete central concrete plant was erected on a railroad spur near location. This plant included five bins of five carload capacity for aggregates, and a bulk cement plant equipped with the latest type of photo-electric cell control scale. A fleet of fourteen trucks delivered the ready mixed concrete to the various building sites. For the entire job a total of 3,000 carloads of material was used.


Row of hangars and shops at Hamilton Field. These structures have monolithic concrete walls with steel trussed roofs.

The maximum concrete run for any one day was 700 cu. yds. and a total of 70,000 cu. yds. of concrete was used, which gives some idea of the size of the project. But more important is the fact that complete control over the concrete mixtures was obtained at all times. Both army and civilian observers agree that the central concrete plant proved its worth in maintaining this control.

A government inspector was on duty at the plant during all operations, and complete records of mixture and deliveries were kept. All water control equipment was calibrated and moisture determination was made on the aggregates to assure proper water ratio. Since careful proportioning had been worked out in advance, it was necessary only to modify the ingredients slightly in the successive batches to take care of variations in materials from different sources. The result of this control was uniformly dense and workable concrete which is particularly essential for architectural concrete work. Test cylinders showed strengths always well within the design strengths required by the specifications. The contractors were well pleased with the careful control methods used because labor was saved in placing the uniformly workable concrete, and an appreciable saving in material cost was made due to maximum yield being obtained.

The walls of all buildings were finished on the exterior with portland cement stucco prepared under a special formula which brought excellent results. The walls were first given a dash coat of equal parts of portland cement and sand to provide a bond between the finish stucco and the concrete. By applying the dash coat mixture with force a certain mechanical bond was developed with the concrete surface which was made rough intentionally by casting the concrete against rough lumber forms. This dash coat was kept wet for 48 hours and was then followed by a ⅜-in. scratch coat consisting of a 1 to 3 mix with 10 lbs. of hydrated lime per sack of cement. This was also kept wet for 48 hours and then permitted to dry for seven days. The second coat was then floated on and sprayed with water constantly for three days. The finish or texture coat was then applied, a mixture of 90 lb. white waterproof portland cement, 10 lb. hydrated dolomite lime, 1 lb. No. 200 Marshall-Dill white color and 125 lb. each of Fanschell and Monterey sand for each cubic yard of stucco.

Various stucco textures were used, all of a modified nature to avoid mechanical appearance.

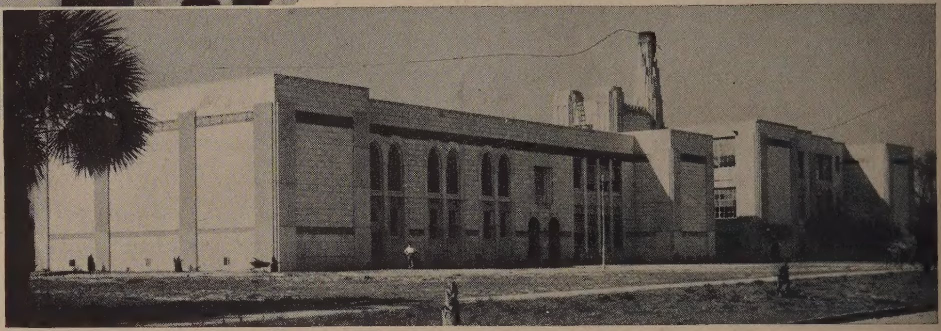
At the time of occupation somewhat less than $5,000,000 had been spent on the project which included eight miles of paving, seven miles of sewers and eight miles of water mains. That this extensive project could have been carried out for this sum is attributed to fine design, efficient operation and management and the use of economical materials. On the eve of his departure for Hawaii a few weeks ago to undertake the building of what will be the world's largest air base, brother officers of Captain Nurse gave him a testimonial banquet in appreciation of his splendid work at Hamilton Field.

Group of barracks buildings, each housing 200 enlisted men.

Another Beautiful CONCRETE SCHOOL

. . . in the material that allows complete design freedom—with economy

Cast stone and cast stone veneer were used in building the new and rehabilitating the old parts of Chapman School, Apalachicola, Florida



WHY has concrete climbed through the depression until it is a foremost combined architectural and structural material? The answers:

(1) Concrete is consistently low in first cost—durable and low in maintenance under the widest range of climatic and service conditions.

(2) Concrete lends freedom in design. Recent architectural concrete structures of note run the gamut of building functions, architectural types and surface textures.

Many of these buildings are monolithic. Others use cast stone either as trim or for the complete exterior. Cast stone is available in a wide range of colors and textures. Close color *control* assures uniformity, and proper contrast or harmony with other materials used in conjunction. Detail is reduced in cost.

Have you the Cast Stone Service Bulletins? These practical data sheets cover copings, store front remodeling, color, specification data, and examples of design application. Sent free on request.

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